

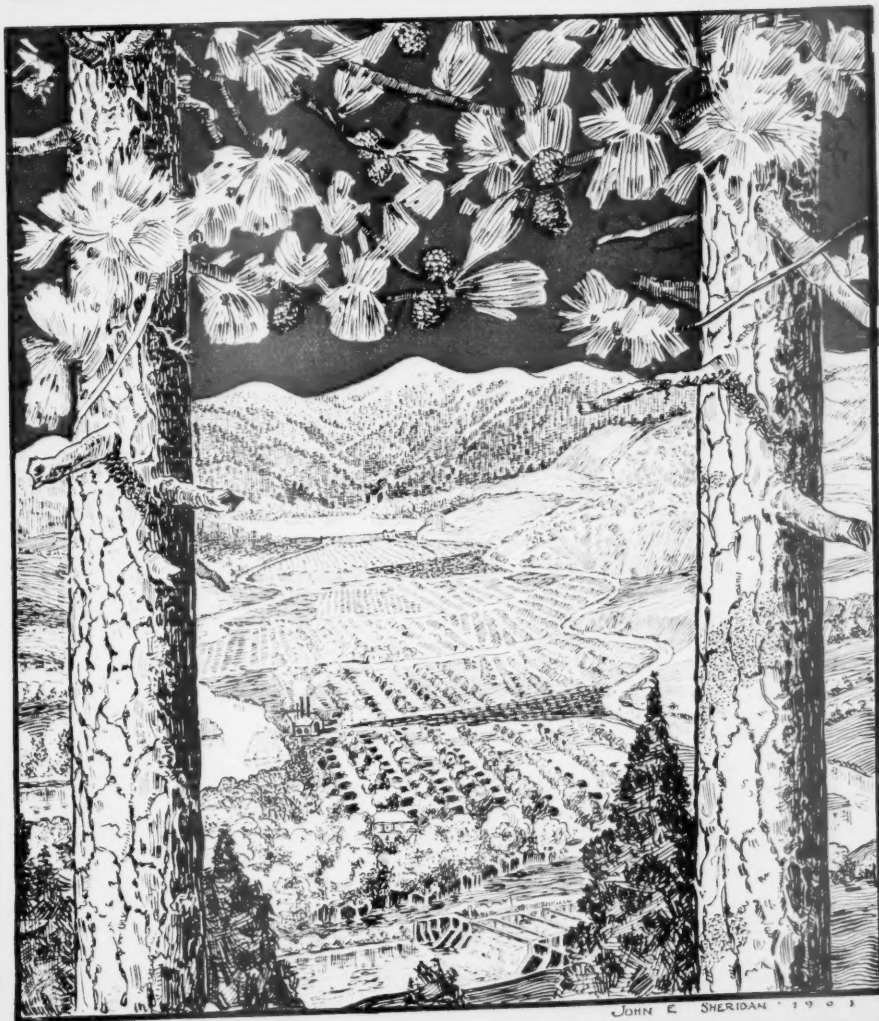
IRRIGATION CREATES HOME MARKETS, by Hon. James Wilson

Vol. VIII—No. 1

JANUARY, 1902

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FORESTRY AND IRRIGATION



JOHN E. SHERIDAN 1901

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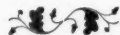
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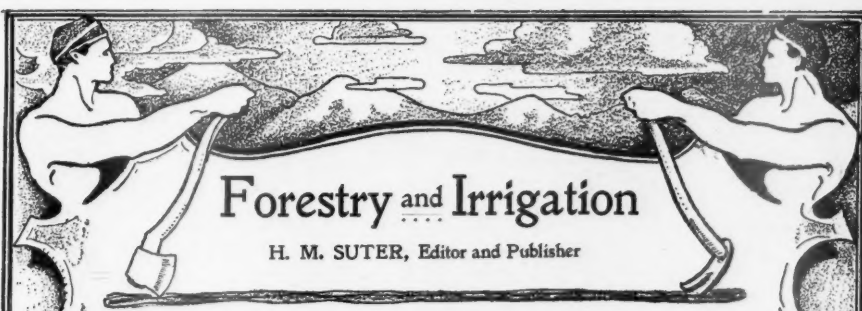
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The objects of the Association, as set forth in its Constitution, are as follows:

1. The adoption by the Federal Government of a permanent policy for the reclamation and settlement of the public domain, under which all the remaining public lands shall be held and administered as a trust for the benefit of the whole people of the United States, and no grants of the title to any of the public lands shall ever hereafter be made to any but actual settlers and homebuilders on the land.
2. The preservation and development of our national resources by the construction of storage reservoirs by the Federal Government for flood protection, and to save for use in aid of navigation and irrigation the flood waters which now run to waste and cause overflow and destruction.
3. The construction by the Federal Government of storage reservoirs and irrigation works wherever necessary to furnish water for the reclamation and settlement of the arid public lands.
4. The preservation of the forests and reforestation of denuded forest areas as sources of water supply, the conservation of existing supplies by approved methods of irrigation and distribution, and the increase of the water resources of the arid region by the investigation and development of underground supplies.
5. The adoption of a harmonious system of irrigation laws in all the arid and semi-arid states and territories under which the right to the use of water for irrigation shall vest in the user and become appurtenant to the land irrigated, and beneficial use be the basis and the measure and limit of the right.
6. The holding of an annual Irrigation Congress, and the dissemination by public meetings and through the press of information regarding irrigation, and the reclamation and settlement of the arid public domain, and the possibilities of better agriculture through irrigation and intensive farming, and the need for agricultural education and training, and the creation of rural homes as national safeguards, and the encouragement of rural settlement as a remedy for the social and political evils threatened by the congestion of population in large cities.



Forestry and Irrigation

H. M. SUTER, Editor and Publisher

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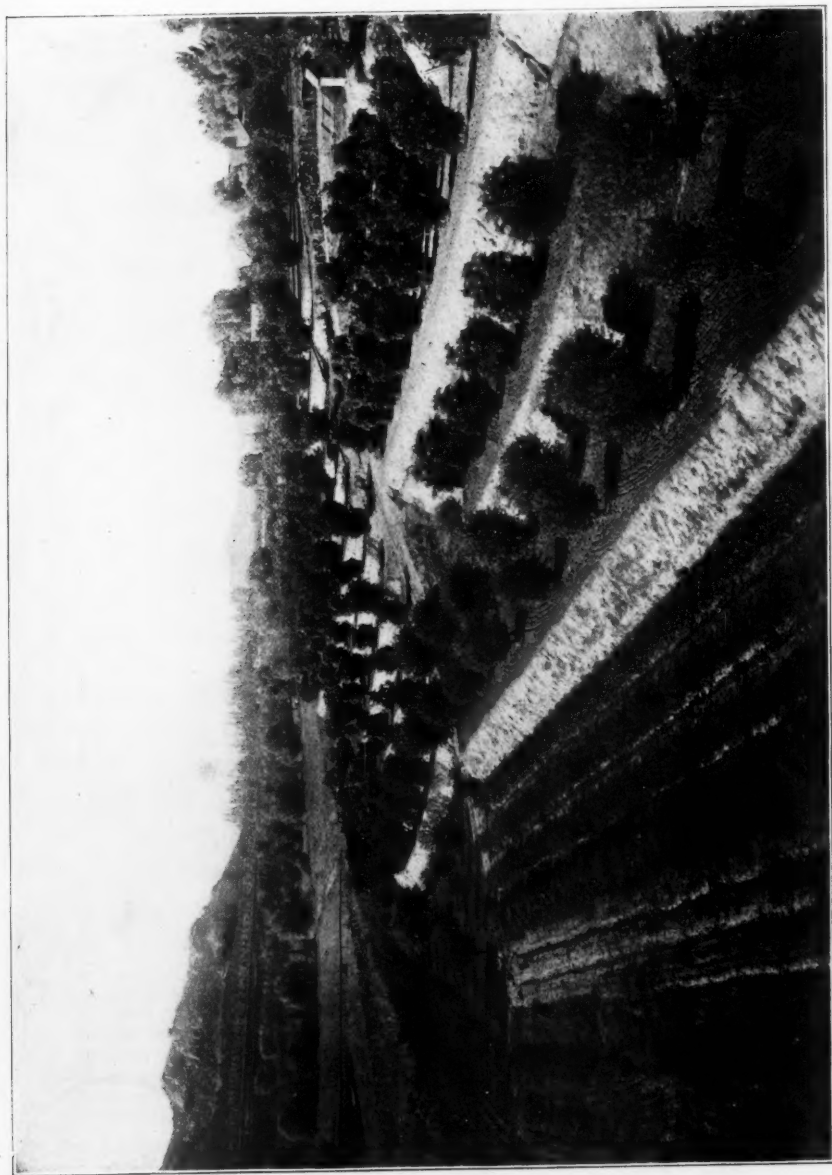
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FORESTRY AND IRRIGATION is the official organ of the American Forestry Association and The National Irrigation Association. Subscription price \$2.00 a year; single copies 20 cents. Copyright, 1902, by H. M. Suter. Entered at the Post Office at Washington, D. C., as second-class mail matter.

Published at
5 & 7 ATLANTIC BUILDING

Washington, D. C.



TERRACE IRRIGATION, REDLANDS, CALIFORNIA.

Forestry and Irrigation.

VOL. VIII.

JANUARY, 1902.

NO. I.

NEWS AND NOTES.

Compromise Irrigation Bill.

The western Senators and Representatives have wisely concluded that they cannot expect action in the line of national irrigation until they themselves harmonize their differences and come together upon some definite proposition. Senator Warren, of Wyoming, has taken the lead in the matter by calling the western men together for general discussion of the situation. As a result a committee of seventeen, one member from each of the arid and semi-arid states and territories, was appointed to draft a bill. The outcome has been a modification of the Hansbrough-Newlands bill of the last session of Congress.

This proposed bill creates what is known as the Reclamation Fund, from the proceeds of the disposal of the public lands in the arid and semi-arid states and territories. Surveys of reservoirs and main-line canals are to be made and the feasible projects constructed by the Secretary of the Interior, payment being made out of the Reclamation Fund. The government land reclaimed is to be thrown open to free homestead entry in tracts not to exceed 80 acres, payment to be made for the cost of reclamation, before title is finally passed, at a rate of \$5 per acre.

If land in private ownership is found to be susceptible to irrigation from these irrigation works, rights to use of the water are to be disposed of to the owners in quantities not to exceed 80 acres at a cost of not less than \$5 per acre.

The amounts received are to be covered back into the Reclamation Fund to be used in future work. No undertakings are to be begun until sufficient funds are in the treasury. It is understood that the western members have individually pledged themselves to sup-

port a compromise measure, and, although the bill is not as desirable as the Newlands bill, yet it is welcomed as an evidence that the western men have finally shown that an agreement can be reached on some general measure.

Change of Degree.

The New York State College of Forestry no longer confers the degree of Bachelor of Science in Forestry (B. S. F.) on its graduates. The degree now conferred is Forest Engineer (F. E.). The reasons for the establishment of this title are expressed in an article in the June FORESTER on "The Proper Professional Title for Foresters," by Dr. John Gifford.

It has been decided that those students who have already been graduated from the New York State College of Forestry may receive the new degree in place of B. S. F.

A Plea for New Jersey Forests.

The following open letter has been addressed to Franklin Murphy, Governor of New Jersey:

To His Excellency Hon. Franklin Murphy, Governor of the State of New Jersey:

We, the undersigned, members of the New Jersey Foresters' Club, of the New York State College of Forestry, Cornell University, do earnestly petition that you will use your influence in the formation of an effective forest service. New Jersey is now far behind neighboring states in this respect, although she possesses an immense amount of land fit for no other purpose, which has once produced good timber, but which is now annually burnt over to the



A CEDAR SWAMP AFTER A FIRE, SOUTHERN NEW JERSEY.

detriment of the state in many ways. The state is most favorably located for the sale of wood, having excellent means of transport, both by rail and water, with markets near at hand, and is also admirably fitted for wood production, owing to favorable soil and climatic conditions. A great variety of valuable species will grow well, if protected and encouraged, on the mountains of the north and in the sandy districts of the south. Very little has as yet been accomplished in this line in the state. We sincerely hope that you will use your influence in the formation of a commis-

sion and the appointment of an educated state forester to take charge of forest matters. We respectfully recommend that the state forester, in addition to his duties as secretary to the Forest Commission, be appointed professor of forestry in the State Agricultural College.

Much attention is paid to game, but how much more important is the protection of the forests upon which the game is dependent? The question of water supply is also an important one, and all admit that the best and purest water comes from an uninhabited and forested watershed. Heretofore forestry has been more or less connected with the geological survey. We think, however, that the time is ripe to place the subject on its own footing, with a state forester to push matters and accomplish something before our forests have been completely devastated.

Yours very respectfully,

J. C. Gifford, Princeton;
William J. Ward,
Montclair; Charles F.

Littlejohn, Montclair; Samuel M. Higgins, Flemington; Edward P. Welsh, German Valley, and H. F. Weiss, Paterson.

Irrigation Meeting in Washington.

Hon. Francis G. Newlands, of Nevada, is manifesting his continued interest in irrigation

by bringing prominently before the leading men of the Senate and House of Representatives the claims of the national irrigation movement. He has not only taken a vigorous part in shaping the compromise irrigation bill, but has sig-

nalized its completion by giving a banquet to the members of the Senate and House Committee on Irrigation and to leading men of both great political parties.

At this banquet, on December 23, the speakers were Hon. Jas. Wilson, Secretary of Agriculture; Hon. Charles D. Walcott, Director of the Geological Survey; Mr. Gifford Pinchot, Chief of the Bureau of Forestry, and Mr. George H. Maxwell, of the National Irrigation Association.

Secretary Wilson spoke of the importance of irrigation in creating opportunities for homes for those who are seeking them, and in particular stated that the sons of farmers of Iowa and adjacent states were going to Canada for land. These vigorous, energetic men, he insisted, should be retained as citizens and induced to remain within our own borders. The opportunities for home markets was also dwelt upon, and the immense value of the development of the arid region to the remaining part of the United States was shown.

Mr. Walcott described the surveys and examinations which have been made of the vast public domain, and briefly referred to the work of the Geological Survey and its investigation of the extent to which the arid lands can be reclaimed. He emphasized the fact that his bureau was one primarily of information, but that in the engineering branches it had one of the best organized corps of experienced men, capable of carrying forward the construction of reservoirs and main-line canals, if desired by Congress.

Mr. Pinchot showed that the national government had already begun the work of water conservation by setting aside the forests on the catchment areas, and that this work is to be continued by building reservoirs largely within these forest reserves.

Mr. Maxwell spoke of the wonderful growth of the national irrigation movement, especially in the East, and the close affiliation of great associations of manufacturers, who are looking to the West for the future market, and of the labor organizations, who view the public land as an outlet and opportunity for

work in time of industrial pressure. He dwelt upon the fact that irrigation is not a local matter, but one of interest to all the people of the United States, owners of this vast domain, and who are interested not simply as proprietors, but also as citizens in seeing it put to the best use and made of highest advantage to all industries and occupations.

Iowa Park and Forestry Association.

At the meeting of the Iowa Park and Forestry Association held at Des Moines on December 11, a bill was drafted, to be presented to the state legislature, proposing to create the office of state park commissioner and to make the Secretary of the Department of Horticulture *ex-officio* incumbent of the office. He is to have general supervision over proposed parks, and forest and orchard reservations in the State of Iowa. The bill provides that persons may set aside tracts of land for forest or orchard reservations and receive concessions in the way of taxation. The object of the movement is to encourage the making of many small parks along the streams of the state and near the lakes. The Park and Forestry Association will co-operate with the Horticultural Society in having a new department created, at the head of which will be the Secretary of the Horticultural Society. The Forestry Association also passed resolutions indorsing the plan for a great national forest reserve at the headwaters of the Mississippi, and for other national forest reserves. The resolutions also favor permitting the President to set apart additional ground for park purposes, as he has the authority now to make forest reservations.

The Iowa Park and Forestry Association was organized at Ames in November, at which time the following officers were elected:

Dr. Thomas H. McBride, Iowa City, president; Wesley Greene, Davenport, vice-president; L. H. Pammel, secretary; Geo. H. Van Houten, Lenox; C. A. Mosier, Des Moines; Prof. H. C. Price, Ames, members of the executive board; Silas Wilson, Atlantic, treasurer.

The object of the Association is to create an interest in the preservation of forests, encourage the establishment of parks, to create an interest in the better care of cemeteries, to encourage state and national legislation for rational forest management and the creation of more forest reserves. Since the announcement of the formation of the organization the secretary has received many letters of encouragement from Iowa people.

To Preserve the Adirondacks.

In response to a letter sent out by ex-Judge Warren Higley, president of the Adirondack League Club, a meeting of men interested in the preservation of the Adirondack forests was held at the offices of the Board of Trade and Transportation, in New York, December 12th.

Among those present were Lieutenant Governor Timothy L. Woodruff, ex-Judge Warren Higley, Edward H. Litchfield, Henry S. Harper, Harry V. Radford, James W. McNaughton, W. H. Boardman, Colonel W. F. Fox, State Superintendent of Forests, and Colonel A. G. Mills.

Mr. Higley appointed a committee of five, who are to devise means for mak-

ing permanent an organization to be devoted to the object of preserving the Adirondacks, and report at a meeting to be held at the rooms of the Board of Trade and Transportation some time in January.

Massachusetts Forestry Association.

The fourth annual meeting of the Massachusetts Forestry Association was held the first week in December, in the rooms of the Appalachian Mountain Club, Tremont Building, Boston. A review of the work during the past year was given by Secretary J. Woodward Manning, who told of the successful efforts of the forest committee in preventing the despoliation of the Blue Hill reservation by a trolley company. The committee presented a substitute route and the other one was given up.

The report also commented on the proposed amendments to the tree-warden law and the movement to secure more money to preserve Greylock Mountain. It was announced that the association has secured permanent headquarters in room 1118, Tremont Building. The following officers were elected:

President, Henry P. Walcott of Cambridge; vice-presidents, John E. Rus-



YOUNG TREES KILLED BY WINTER FLOODING, ADIRONDACKS, NEW YORK

sell of Leicester, John A. Aiken of Greenfield, Lucia A. Mead of Boston, Sylvester Baxter of Malden, Mary L. Ware of Boston, William C. Whitney of New York and Washington, Mass.; William F. Gale of Springfield; treasurer, James S. Russell of Milton; secretary, Edwin A. Start of Medford.

**Artesian
Water for
Irrigation.**

From a recent issue of the Ft. Worth (Tex.) *Register* it is learned that "While prospecting for oil near Engle, N. M., in what is known as the famous desert, 'Journey of Death,' a Colorado company struck a mammoth artesian well at a depth of

acres of land that heretofore have lain idle and were only a desert.

"This is great news to the people of the North and East, who look upon the arid region of the Southwest as an irredeemable desert. It is nothing new to the people of this part of the country, who know that the arid region has an abundance of pure water under the surface. Geologists who have surveyed the country have called attention to the presence of this water, and have pointed out the ease with which the arid lands could be irrigated by the use of artesian wells. All over the Panhandle of Texas—that awful land, condemned by the geographers as the 'Staked Plains' and the 'Jornado del Muerto'—the



AN ARTESIAN WELL.

1,000 feet, with a flow of 2,000 gallons per hour, through a two-inch hole.

"This discovery of artesian water in the heart of New Mexico's desert section is considered of more importance than a discovery of oil. It portends more millions than any rich mineral find, and it will irrigate thousands of

windmill is raising water from subterranean depths to supply drink for hundreds of thousands of cattle. It has not been used for irrigation because we have not reached that point in the march of development, but we know that the water is present in abundance, and only the intelligent co-operation of the capital-

ist and the irrigation engineer is needed to draw this water from the depths and turn it over the surface of the land, to transform the parched and barren plains into green orchards and blossoming gardens."

Minnesota Meeting.

The Minnesota State Forestry Association held a meeting in Minneapolis during the first week in December. A number of important matters were discussed by the members present, and the following list of papers was read: "Forestry in Minnesota," Charles M. Loring; "The Aesthetic Side of Forestry," Alfred Terry; "Minnesota's Interest in Forestry," Gen. C. C. Andrews; "Special Course in Forestry in the State University," Prof. Samuel B. Green; "Present Status of the Park Question," Mrs. William T. Bramhall, and "Minnesota's Greatest Opportunity in Forestry," H. H. Chapman.

Professor Green advocated the establishment of a School of Forestry in connection with the State University. A resolution was adopted by the association pledging the members present to use their best efforts with their Congressmen to secure the enactment of a law providing for a national forest reserve in Minnesota. Mr. Charles M. Loring was reelected president of the association and Mr. W. Strand secretary.

National Live Stock Association.

More than one thousand delegates, representing thirty-eight states and territories, attended the fifth annual meeting of the National Live Stock Association, which was held in Chicago during December. A great amount of important business was transacted, and among the subjects that came up for discussion was the relation of forestry and irrigation to the live-stock interests.

Among the speakers at the meeting were Hon. James Wilson, Secretary of Agriculture, who addressed the convention on the "Value of Mixed Live Stock Husbandry to the Farmer;" Mr. Gifford Pinchot, who spoke on the "Grazing of Live Stock in the Forest Re-

serves," and Mr. George H. Maxwell, who addressed the association on the subject of "Increasing the Range Capacity by Irrigation."

Resolutions were unanimously adopted by the delegates endorsing President Roosevelt's suggestion that the administration of the national forest reserves be transferred to the Department of Agriculture. Congress is also urged in these resolutions to repeal or amend the Liebo Land laws, in order that they cannot be used to defraud the government.

California.

The third annual convention of the California Water and Forest Association was held at San Francisco on December 21, and was attended by a large number of the representative men of the state. Forestry and irrigation, both state and national, were discussed, and the views of President Roosevelt on the forest and water problems, as expressed in his message, were heartily endorsed. A vigorous campaign for the coming year was outlined by the delegates present.

The treasurer's report showed that since the organization of the Association receipts from members were \$23,639.80, and that the disbursements had been \$22,733.84, of which \$9,074.86 were in coöperation for surveys in connection with the federal government.

The election of officers resulted as follows: President, Wm. Thomas; vice-presidents, N. P. Chipman, Arthur R. Briggs, and J. B. Lippincott; treasurer, F. W. Dohrman; secretary, T. C. Friedlander; advisory committee, David Stair Jordan, C. D. Marx, W. S. Green, W. E. Smythe, C. E. Thomas, Frank Soule, A. J. Pillsbury, Scipio Craig, J. M. Wilson, Thos. J. Field, Timothy Hopkins, and E. F. Adams.

The president appointed the following executive committee: Chief Justice William H. Beatty, Benjamin Ide Wheeler, Frank J. Symmes, W. H. Mills, Jno. D. Works, and Wm. F. Willis.

The resolutions adopted at this meeting of the Water and Forest Association favor the reservation of all government forest lands within the state; a reforming of the water laws of California, and



HEAVY SPRUCE TIMBER, MAD RIVER, NEW HAMPSHIRE.

the appointment of a commission for the purpose. Generous appropriations by the state, to be expended in collaboration with the federal government in irrigation investigations, are urged.

Forest Conditions in New Hampshire.

Ex-Governor Frank W. Rollins, President of the Society for the Protection of New Hampshire Forests, in a recent interview, had the following to say concerning forest conditions in the Granite State and the work being done by the Society :

"Our work thus far has been along educational lines. We have had the service of several able speakers, who have gone about the state addressing various audiences, such as the granges, and gatherings of summer visitors at

our mountain resorts. It is the belief of the Society that, by pursuing this course, and by the publication of articles in the newspapers of the state, a healthy sentiment may be built up toward the protection of our trees, and, further, toward the planting of new forests.

"The Society has been bold enough to hire a forester, a man who has had a thorough education in forestry, and who has been doing practical forest work at Biltmore for some time ; he is now going about the state delivering lectures, and visiting the farmers and lumbermen, and giving them advice as to how to cut their timber, and how to plant new forests. His services are open to all residents of the state free of charge.

"It is said (by those who ought to know) that the best spruce timber re-

maining in the United States is in the mountain regions of New Hampshire, and there are also scattered about in various sections of the state considerable quantities of white pine, which are being rapidly cut. It is not the object of this Society to prevent the cutting of timber, but to induce the lumbermen and the farmers to cut their timber according to the rules of forestry, so that the crop may be perpetual.

"It is unnecessary to point out how important it is to the State of New Hampshire, and, in fact, to all of New England, that its forests should be perpetuated. This fact is recognized by all, and it is simply a question of means, and the best way to bring this about. It is a very difficult matter to regulate by legislation, though we think something of a practical nature can be done in this line; but it can only be done after the people have been properly educated. We think a great deal can be done by personal efforts among the lumbermen, especially when we get them to understand that we are not trying to prevent the proper cutting of timber. We believe that timber is a crop which should be harvested, as much as rye or oats, but that it should be done in a sensible manner, looking to the future supply."

New Forest Reserve.

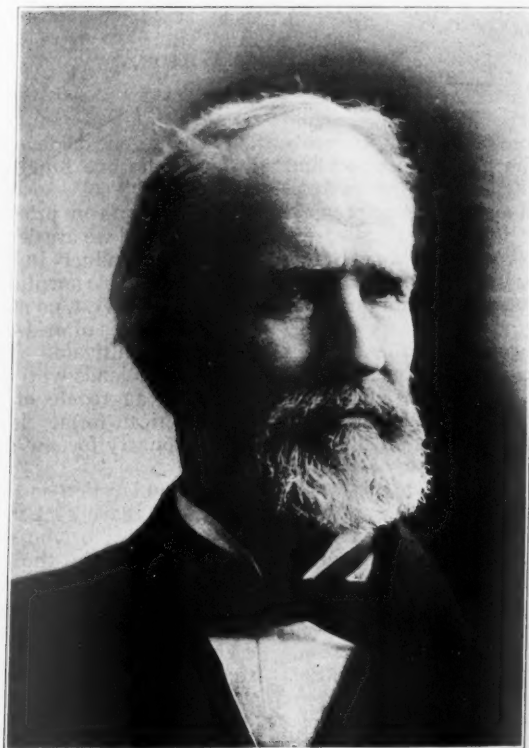
The register and receiver of the Kalispell (Mont.) land office has received a letter from the Interior Department instructing him of the withdrawal of all lands from settlement in Montana north and west of the Kootenai River. The order will affect over 1,000,000 acres of land in Montana, besides 276,000 acres in Idaho, which when surveyed will be made into a new forest reserve, to be known as the Kootenai Forest Reserve.

Obituary.

The many friends of Dr. Bernhard E. Fernow, Director of the New York State College of Forestry, will greatly regret to learn of the death of his only daughter, Miss Gordon Fernow, which occurred on January 3. Miss Fernow died after a short illness, which resulted in blood poisoning. She was just twenty-one years of age, and was one of the most prominent members of the senior class in Sage College, Cornell University. Miss Fernow is survived by her parents and four brothers, two of whom are also students in the university.

In Connecticut. State Forester Mulford, of Connecticut, has received offers of land for the state park from twenty Connecticut towns. These bids were received in response to the call which was sent out by Mr. Mulford several months ago, stating the provisions of the new state law, which took effect last August, under which the state is empowered to buy land for a practical demonstration of forest methods. The state already owns a sixty-acre tract of waste plain land above Rainbow, in the town of Windsor; and at the Poquonock experiment station Mr. Mulford is raising thousands of young pine and spruce trees to be set out on sandy waste lands of the kind found on the Rainbow purchase.

The state authority for the acquisition of this property is the law passed at the last session of the legislature, which provided for the expenditure of \$2,000 under certain conditions, which were mentioned in the November FORESTER. The intent of the law is to provide an object-lesson in the handling of woodland, especially on poor soil, so that the citizens of this state may profit by the experiments in scientific forestry carried on near their own homes.



HON. JAMES WILSON,

SECRETARY OF AGRICULTURE AND PRESIDENT OF THE AMERICAN FORESTRY ASSOCIATION.

Among the men who have been especially prominent in forestry and irrigation is the distinguished Secretary of Agriculture, to whose care has been confided the consideration of many of the phases of forest preservation and irrigation possibilities.

As President of the American Forestry Association, he has taken an active part in its meetings, and has infused much of his characteristic energy and directness into its business transactions.

Mr. Wilson was born in Ayrshire, Scotland, August 16, 1835, and came to the United States in 1852, settling first in Connecticut, and three years later removing to Tama County, Iowa, where he became a farmer. He was for three terms a member of the Iowa Assembly, and Member of Congress from 1873 to 1877 and from 1883 to 1885. For six years he was the Director of the Iowa Agricultural Experiment Station. On March 5, 1897, he became Secretary of Agriculture and a member of President McKinley's Cabinet, where he ably championed the cause of forest protection, and has bent his energies toward the largest development of the agricultural resources of the country.

IRRIGATION CREATES HOME MARKETS.*

BY HON. JAMES WILSON,

Secretary of Agriculture.

IF we take note of what is in men's minds at the present time we find that public discussion turns more upon markets than on any other one proposition in planning for our national prosperity. The policy of the United States for the last forty years has been to build up home markets, not only for our manufacturers, but for our farmers as well. We have built up our manufacturers in order that we might have home markets for our farmers, and also to encourage everything that could permanently live and prosper within the United States through the diversification of our industries.

Changes are coming about gradually. When I was a boy, forty-six years ago, I went to Iowa. It was a new country in those days, and there was no homestead law. We bought our land. Our friends, the farmers of the East, were somewhat alarmed as to what the result might be; but those friends in the East built railroads out to us, and overtook us with the railroads, and sometimes went farther West with them than we had gone, and waited for us to come, and the result, as regards the marketing of eastern farm products, was in some cases unsatisfactory to the eastern farmer; but the eastern manufacturer got such a market as is not to be found anywhere else in the world outside of the Mississippi Valley, and the prosperity of the eastern manufacturer has in turn brought prosperity to the eastern farmer.

Whatever temporary detriment the opening up to agriculture of the rich lands of the Mississippi Valley caused the eastern farmer, has been wholly overcome and overbalanced by the benefit which the eastern farmer has received from the establishment of the great manufacturing industries of the East.

We have gone on developing the West as far as the one hundredth meridian. Last year we sold \$950,000,000 worth of American farm products in foreign countries, and we are developing a market for our products in Asia which will absorb the whole surplus of farm products from the West, no matter how many additional acres of arid land we may reclaim and cultivate. The product of the western lands will simply increase the great aggregate of wealth which the American farmer is bringing back to this country for our agricultural exports.

The immigration in those early days of which I have spoken was of homeseekers. People who came from foreign countries in those days wanted farms, and they got them and built up the northwest. A change has come—a most undesirable change: The homeseekers who want farms are not coming to such an extent as they did in those early days. The man is coming to this country to live in the cities and work in the factories, and the admonition is forced upon us that the United States of America in its population is becoming somewhat out of balance as regards the town and the country. The cities are growing in proportion faster than the country.

There is danger in this, as all recognize. We should do everything we can to promote the growth of a rural population by opening opportunities for people to get homes on the land and training them to till it, so that they will know how to get their living from the ground. Everything we can do, and that which the Department of Agriculture is doing, to make conditions of rural life more pleasant and prosperous, tends to correct this growing evil of too many

* Extract from a speech delivered at Washington, D. C., December 23, 1901, at a banquet given by Hon. F. G. Newlands to prominent public men, including members of the Senate and House Committees on Irrigation.

people in our cities and too few in the country.

A prominent question to-day in the minds of a great many people is a desire for foreign markets; but we must never forget that the best market is the home market, both for the farmer and the manufacturer. The Mississippi Valley is worth, as a market, for the manufacturers of the United States more than all the rest of the world put together, because those people all have good incomes and they spend their money.

I am in favor of having more homes out in the West. Uncle Sam has a great deal of land and a great deal of water out there. That land is arid, and the water which would make it productive is running to waste. I would wet some of those great mountain valleys and plains, build more homes, and make more markets.

The population of this country is out of proportion. Only about one-tenth of it is in the western half of the country. It would be a good thing for all sections to more nearly equalize the growing population of the United States. I would dam some of those rivers and streams, and spread the water out over the land in Uncle Sam's valleys and establish new fruit ranches and new farms to grow the new kinds of wheat we are producing, so we could send more flour to Asia; also new farms to grow sugar beets, so we could grow more of our sugar in this country, and start new mines and make all sorts of new demands in these new western communities, and make new markets for all our eastern manufacturers. The eastern manufacturer will sell in the West, but the western farmer will not sell in the East, except fruits and things like that, which will not compete with the eastern farmer.

In 1900 we sold \$840,000,000 worth of farm products to the outside world, and we brought back just half of that. We paid \$420,000,000 in 1900 for things we cannot grow in the United States. The Department of Agriculture is at work to get those things grown in the United States, so as to make more homes

for our own people, give more work to our own people, make better wages for them, and make more markets for us here at home that will stay with us forever.

We can grow over \$200,000,000 worth a year of farm products in the United States more than we are growing now. We will produce that \$200,000,000 worth of things that grow in the fields that we have heretofore been importing right on our own American farms, and we will increase the American home market as all you can do with foreign countries throughout the world would not increase it. We can do it quicker and better by far if this great arid region out west is reclaimed and made productive.

That is the development of the United States that I want to see. And I want to say to you, gentlemen, that I have all the confidence in the world that you will move along conservative lines. You must not alarm our eastern brethren by trying to do everything all at once. This great work will take time. It will take many years to wet all that dry land, but we ought to begin now and go along carefully each year until the great task is done.

You will not get many dams built or neighborhoods started before the eastern business men will have their traveling men out there to sell goods. They will find it is a grand thing to have people out there to buy from them. It will make such a purchasing force there as the world never saw before. Stop for a moment and think what our home market is today. The whole world wants to get into the United States to sell things, but our home market is for ourselves first, to develop it to the fullest extent.

You need not worry about finding settlers for your arid land after you have reclaimed it. The Iowa farmers have the money now to buy that land and put their boys on it just as fast as you can get it ready for them, and they will do it; and I would much rather see them do it than have them go to the British possessions.

THE APPALACHIAN FOREST RESERVE.

THE SUBJECT OF A SPECIAL MESSAGE TO CONGRESS BY
PRESIDENT ROOSEVELT.

THE movement to establish a national forest reserve in the Southern Appalachian Mountains has received close attention in Congress during the past month. On December 6 Mr. Brownlow, of Tennessee, introduced a bill in the House of Representatives appropriating \$10,000,000 for the purchase of lands in the Southern Appalachian region for a national forest reserve, to be known as the "McKinley National Park and Forest Reserve." December 17 a bill was introduced in the Senate by Mr. Pritchard, of North Carolina, appropriating \$5,000,000 for the purchase of 2,000,000 acres, to be known as the Southern Appalachian Forest Reserve. A bill containing like provisions was on the same day introduced in the House by Representative Moody, of North Carolina. This was followed on December 19 by a special message from President Roosevelt, in which he presents the reasons for establishing the reserve and asking the favorable consideration of Congress.

The move to establish a forest reserve in the South began in 1899. Last spring the legislatures of North Carolina, South Carolina, Alabama, Tennessee, and Virginia passed bills ceding to the national government authority to acquire title to lands within their boundaries for forest reserve purposes, with exemption from taxes. The text of the President's message on this subject is as follows:

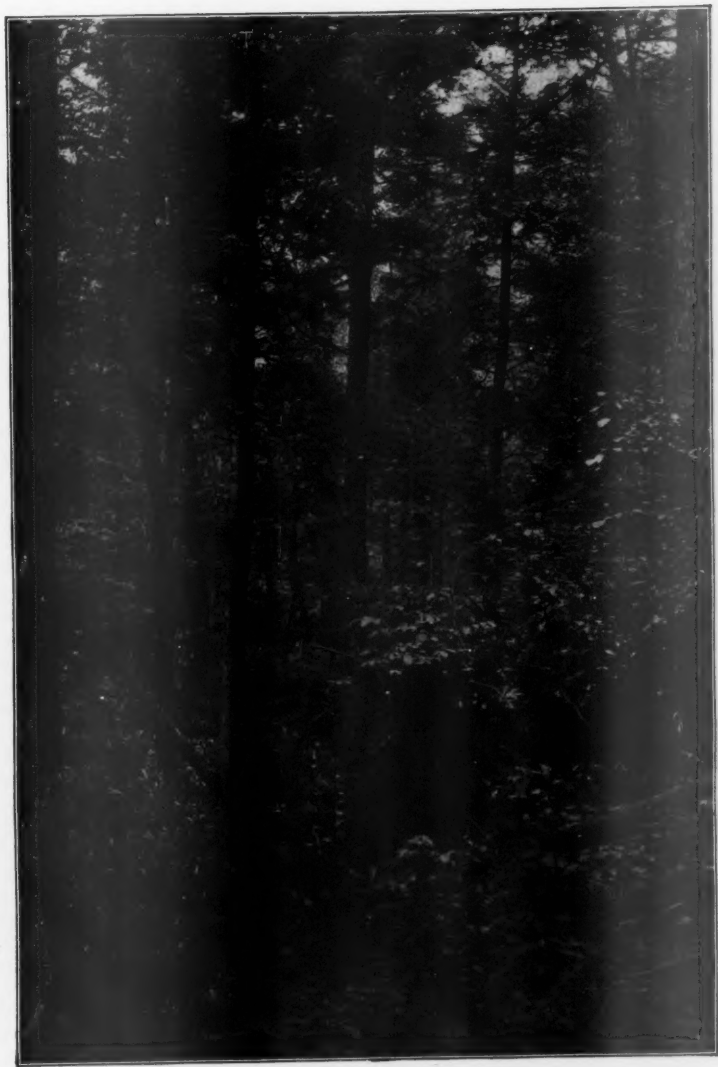
To the Senate and House of Representatives:

I transmit herewith a report of the Secretary of Agriculture, prepared in collaboration with the Department of the Interior, upon the forests, rivers, and mountains of the Southern Appalachian region and upon its agricultural situation as affected by them. The report of the Secretary presents the final results of an investigation authorized by the

last Congress. Its conclusions point unmistakably, in the judgment of the Secretary and in my own, to the creation of a national forest reserve in certain of the Southern States. The facts ascertained and here presented deserve the careful consideration of the Congress. They have already received the full attention of the scientist and the lumberman. They set forth an economic need of prime importance to the welfare of the South, and hence to that of the nation as a whole, and they point to the necessity of protecting through wise use a mountain region whose influence flows far beyond its borders with the waters of the rivers to which it gives rise.

Among the elevations of the eastern half of the United States the Southern Appalachians are of paramount interest for geographic, hydrographic, and forest reasons, and, as a consequence, for economic reasons as well. These great mountains are old in the history of the continent which has grown up about them. The hardwood forests were born on their slopes, and have spread thence over the eastern half of the continent. More than once in the remote geologic past they have disappeared before the sea on the east, south, and west, and before the ice on the north; but here in this Southern Appalachian region they have lived to the present day.

Under the varying condition of soil, elevation, and climate many of the Appalachian tree species have developed. Hence it is that in this region occur that marvelous variety and richness of plant growth which have led our ablest business men and scientists to ask for its preservation by the government for the advancement of science, and for the instruction and pleasure of the people of our own and of future generations; and it is the concentration here of so many valuable species, with such favorable conditions of growth, which has led



FOREST SCENE IN THE SOUTHERN APPALACHIAN REGION.

forest experts and lumbermen alike to assert that of all the continent this region is best suited to the purpose and plans of a national forest reserve in the hardwood region.

The conclusions of the Secretary of Agriculture are summarized as follows in his report :

1. The Southern Appalachian region embraces the highest peaks and largest mountain masses east of the Rockies. It is the great physiographic feature of the eastern half of the continent, and no such lofty mountains are covered with hardwood forests in all America.

2. Upon these mountains descends the heaviest rainfall of the United States, except that of the North Pacific coast. It is often of extreme violence, as much as 8 inches having fallen in eleven hours, 31 inches in one month, and 105 inches in a year.

3. The soil once denuded of its forest and swept by torrential rains rapidly loses first its humus, then its rich upper strata, and finally is washed in enormous volume in the streams, to bury such of the fertile lowlands as are not eroded by the floods, obstruct the rivers, and fill up the harbors on the coast. More good soil is now washed from these cleared mountain-side fields during a single heavy rain than during centuries under forest cover.

4. The rivers which originate in the Southern Appalachians flow into or along every state from Ohio to the Gulf and from the Atlantic to the Mississippi. Along their courses are agricultural, water-power, and navigation interests, whose preservation is absolutely essential to the well-being of the nation.

5. The regulation of the flow of these rivers can only be accomplished by the conservation of the forests.

6. These are the heaviest and most beautiful hardwood forests of the continent. In them species from east and west, from north and south mingle in a growth of unparalleled richness and variety. They contain many species of the first commercial value, and furnish important supplies which cannot be obtained from any other region.

7. For economic reasons the preservation of these forests is imperative. Their

existence in good condition is essential to the prosperity of the lowlands through which their waters run. Maintained in productive condition, they will supply indispensable materials which must fail without them. Their management under practical and conservative forestry will sustain and increase the resources of this region and of the nation at large, will serve as an invaluable object lesson in the advantages and practicability of forest preservation by use, and will soon be self-supporting from the sale of timber.

8. The agricultural resources of the Southern Appalachian region must be protected and preserved. To that end the preservation of the forests is an indispensable condition, which will lead not to the reduction, but the increase of the yield of agricultural products.

9. The floods in these mountain-born streams, if this forest destruction continues, will increase in frequency and violence and in the extent of their damages, both within this region and across the bordering states. The extent of these damages, like those from the washing of the mountain fields and roads, cannot be estimated with perfect accuracy, but during the present year alone the total has approximated \$10,000,000, a sum sufficient to purchase the entire area recommended for the proposed reserve ; but this loss cannot be estimated in money value alone. Its continuance means the destruction of conditions most valuable to the nation, and which neither skill nor wealth can restore.

10. The preservation of the forests, of the streams, and of the agricultural interests here described can be successfully accomplished only by the purchase and creation of a national forest reserve. The states of the Southern Appalachian region own little or no land, and their revenues are inadequate to carry out this plan. Federal action is obviously necessary, is fully justified by reasons of public necessity, and may be expected to have most fortunate results.

With these conclusions I fully agree, and I heartily commend this measure to the favorable consideration of Congress.

THEODORE ROOSEVELT.

WHITE HOUSE, December 19, 1901.

FORESTRY AND IRRIGATION.

SAVE THE FORESTS AND STORE THE FLOODS—RESERVE THE PUBLIC LANDS FOR HOME-BUILDERS.

BY GEORGE HEBARD MAXWELL.

IN his report on reservoir sites in Colorado and Wyoming, Captain Chittenden says: "Already in the greatest mineral-producing states of the West, California and Colorado, irrigated agriculture yields a greater wealth of product than the mines."

"Forest and Snow" is the title of Bulletin No. 55 of the Colorado State Agricultural College, recently issued by Prof. L. G. Carpenter. In it he says: "The preservation of the forests is an absolute necessity for the interests of irrigated agriculture. The loss of the forest cover means more violent fluctuations during the day, greater difficulty in regulating the head-gates and keeping a uniform flow in the ditches, and hence an additional difficulty in the economic distribution of the water. Also the water runs off sooner; hence the streams drop earlier in the summer, and on account of the lessening of the springs, the smaller is the winter flow."

In a recent editorial the *Denver Republican* says: "The Eldora fire has swept over an area exceeding 36 square miles of valuable timber, and it appears that it was the result of carelessness or indifference of campers, who neglected to extinguish their fire before leaving their camp. It has destroyed the timber growing on the watershed of the Middle Boulder and South Boulder creeks. The snows on that slope of the mountains will be exposed without protection to the rays of the sun and will melt so rapidly that they will be of comparatively little value for irrigation next season. Timber once destroyed in the mountains of this state can never be restored by a new growth, without the lapse of so many years that this generation cannot count upon the restoration of any forest land. For the people liv-

ing now, a forest once destroyed is lost forever.

"It follows, therefore, that something must be done for the protection of mountain forests, or else the time will come when Colorado will be practically without timber. Unfortunately the state is not able to provide this protection. It has not the available funds with which to pay an adequate force of forest wardens. In the East the sentiment seems to prevail that it is a case of indifference on the part of our people, as if they did not appreciate that the destruction of our forests involves for us a terrible loss. It is an erroneous conclusion, and Congress should recognize that the forests of the Rocky Mountains are not destroyed by the recklessness of our people.

"We cannot protect them. We have not the funds with which to pay a sufficient number of forest wardens. The forests are, furthermore, on land which belongs to the federal government, and therefore it devolves upon Congress to provide the necessary protection. An effort should be made at the next session of Congress to impress the truth of this upon the national government, so that it may provide for a force of men numerous enough to give the protection so greatly needed."

Or else "The time will come when Colorado will be practically without timber" means that the time will come when Colorado will be practically without water. This means almost annihilation to the state's greatest industry, irrigated agriculture, and the serious crippling of its mining industry.

And yet here is a frank confession that Colorado is powerless to prevent her own destruction. A stronger argument, from facts that stare in the face, could not be made that the national



VIEW IN SOUTH PLATTE RESERVE, COLORADO. TIMBER ON HILLS BADLY BURNT.

government must step in and, for the preservation of our national territory, save from destruction and waste the water supplies of the arid region. Unless it does this, it is inevitable that an immense area in the West will, in a comparatively brief period, as time goes, revert back to a hopeless and irreclaimable desert.

The people of the whole country are being gradually awakened to this necessity, and there is good ground for hoping that a broad national policy of water conservation, through forest conservation and flood-water storage, will be inaugurated in this session of Congress; but it is certain beyond the shadow of a doubt that if the national government does this it will give neither the arid lands nor the control of their reclamation to the states. It will never surrender or delegate its obligations to reclaim these lands for the benefit of other than *bona fide* settlers, who will build whole communities to disseminate their newly created wealth among the people of the entire country through the enlargement of every channel of our internal trade and commerce.

The close connection between forest preservation and water conservation is clearly shown by Captain Chittenden in his report above referred to where he says: "There seems to be a well-nigh universal consensus of opinion that the preservation of the forests of the arid regions is distinctly a government duty. Considerable appropriations have been made for the survey of the proposed reservations, and ways and means for their preservation are being considered now. One of the great arguments always advanced in favor of forest preservation is the influence which forests are supposed to have in conserving the flow of streams. Inasmuch as the commercial value of these forests is practically insignificant, except for furnishing fuel and rough timber, the water question is really the more important one. If it is properly a government function to preserve the forests in order to conserve the flow of the streams, surely it cannot be less a government function to execute works which will conserve that flow even more positively and directly. Granting all that can be said of forests in this connection, they certainly can never pre-

vent the June rise, and it is precisely this waste flow which the reservoirs will help to save. The forests ought unquestionably to be preserved, and the national government is the proper agency to do it, but the principal arguments therefore apply with accentuated force to the construction of reservoirs."

The fact should never be lost sight of that two-thirds of the whole western half of the United States actually belong to the government—that is, it belongs to the whole people of the country, and nine-tenths of them live in its eastern half. Broadly speaking, it may be said that the people of the East own, and through their representation in Congress, they certainly control two-thirds of the western half of the country.

This great public domain is a precious heritage not only for the generation now seeking new fields of activity, but for generations yet unborn. There is every reason in good sense and patriotism that the East should see to it that this vast area of public land shall be saved for the army of home-builders who want homes, and to this end that the forests shall be preserved, the flood waters stored, and the irrigable land sacredly held as a great trust for those who will make homes on it.

"Save the forests and store the floods" should be the slogan of the movement for the conquest of half a continent from the desert, by the conservation of its water supplies; but with it must go the further motto, "Reserve the public lands for home-builders."



IRRIGATED FRUIT ORCHARD, YAKIMA VALLEY, WASHINGTON.

THE IMMEDIATE FUTURE IN FOREST WORK.*

By GIFFORD PINCHOT,

Forester U. S. Department of Agriculture.

THE salient fact about the immediate future in forest work is the unexampled opportunity. As we look forward to the work just ahead of us, the chance for progress stands out as it never has stood out in forest work in this country before. The opportunity is broadening out in a way that seemed impossible a few years ago, and the opening before all of us in all the different lines of work in which we are engaged is far wider than we are going to be able to use. And that leads me to say (seeing that so many of us are comparatively new in forest work) that the perfectly natural desire of the younger men to begin their life work quickly by dropping here a little and there a little of the thoroughness of their preparation is as completely mistaken as it is thoroughly natural. We have all of us suffered from it. I am not unacquainted with its evil effects in my own case; and before we pass on to the real subject of the evening I want to make this declaration: That the first thing I should advise any man to do who is thinking of taking up forest work in this country is to make his preparation just as thorough as he possibly can, remembering that the opportunity, by the time he can use it, will be greater rather than less than it is now. I have had exactly this experience myself. It took me years to catch up with what I let slip because I thought the opportunity was going to disappear; and the result of it was that I had to stop, as so many men in the Bureau have had to do, and go back for the things I had left out of my preparation just at a time when I needed them most.

People are asking now, all over the country, what ought to be done in forest work. The time of the vague feeling that something ought to be done has gone by, and the specific demand for a specific thing is here; and it is our

business to answer it. This is the great fact in the situation. As a people, we are ready for forestry.

There are two or three special things which we are all striving for, and that must be brought about in the near future if our opportunity is to be used to the full. One of them is the unification of the forest work of the government. We are all glad that the prospect for heartier co-operation between the three organizations that are occupied in forest work is better than it ever has been before; that such co-operation has just now actually begun in a new way; and that the prospect for the immediate future is that we shall all unite with new strength and new effectiveness at the old task.

Another of the essentials for the immediate future is the extension of the forest-reserve system. That may be said to be the first great need of forest work in this country at present. We are coming to it with an understanding and with facts that we have never had before. For example, Mr. Newell* has been compiling maps of the alienated lands in a number of states. Wherever that work has been done we can locate forest reserves with absolute knowledge of how much lieu land selection will be entailed. Some of you may not know that there is a law which provides that any man who owns land inside a forest reserve may exchange it, unless it is a mineral claim, for land outside—a perfectly just provision as applied to settlers, but one which has been thoroughly abused. This law has recently become the great obstacle to the creation of new forest reserves. A knowledge of how many lieu land selections will follow the creation of any reserve will immensely facilitate this most important movement.

*Hydrographer United States Geological Survey.

* Address delivered before the Society of American Foresters November 2, 1901.

There is but little time left in which the government can get control of new reserves, and it must be done now or with enormous difficulty hereafter or not at all. The whole matter is admirably illustrated by the story of the New York State forest reserve. Years ago, before the Adirondack wilderness was worth anything to sell, far-sighted men tried to secure its reservation for the state. They were laughed at. The result of it is that New York (which has a reserve of, roughly, a million and a quarter acres) has had to pay about \$3.50 per acre for the more recently acquired parts of it and must probably pay more hereafter.

Following the creation of reserves is the necessity for a much more intimate knowledge than we have yet of the reserves themselves and of the character of their forests. You are all familiar with the work which has been done in the Geological Survey toward mapping the forest, the burned areas, the agricultural lands, etc. That is an admirable first step in that direction, admirably well done, but a much more intimate study must be made of the forest conditions on all the reserves before any one will be in position to handle the forests in the best manner.

One of the largest projects just ahead is the creation of the Appalachian Forest Reserve in the Southern States. You are all familiar, of course, with the general plan. The states in interest have, without exception, signified their willingness to yield the necessary jurisdiction to the United States. There has been awakened a very powerful interest in the whole subject practically throughout the South, and, with the enthusiastic backing of the Secretary of Agriculture, the opportunity is an admirable one. This is one of the very important movements in forest work.

Another phase of forestry which is rapidly growing is the movement for state forest reserves. Michigan has a small forest reserve, and is anxious to increase it, and to handle it properly. Pennsylvania has about 400,000 acres already reserved. Maryland is studying her forests in coöperation with the Bureau of Forestry. New York, you know,

has been doing so for some time, and, by the way, in New York one of the important movements of the near future will necessarily be the attempt to repeal that clause of the state constitution which forbids cutting, and therefore forbids practical forestry, on the state lands. Vermont has been having a preliminary study of its forests made this summer, also in coöperation with the Bureau of Forestry. California is thinking of appointing a state forester, and is anxious for a state forest school as a part of the State University. Connecticut has appointed a state forester, and has made a small appropriation to purchase a forest reserve, and all along the line this movement is pointing up. It will certainly be important.

I want to speak briefly of a few other opportunities only less vast before referring to some of the specific pieces of work that are pending. In the first place, there is an enormous field opening before the forester who comes in contact with the railroads. The railroads use some 120,000,000 new ties a year, if my statistics are correct. They use enormous quantities of timber besides for construction in various ways. They own immense areas of land, either in land grants in the West or areas they have acquired in the South and East, and their influence on the side of forestry is going to mean more than almost any other single factor. The Bureau has just undertaken a working plan for the Baltimore and Ohio Railroad for 125,000 acres in West Virginia, which, I hope, means the beginning of intimate contact with the great railroads of the country just as fast we have men to do the work and money to pay for it. That is one of the great opportunities, and it is only one of a dozen which there are not yet men and money enough to handle.

Another great opportunity is offered in the South by the turpentine question. One of the largest industries of that section of the United States is practically disappearing with what may, in all seriousness, be called frightful rapidity, simply for the lack of modern methods. The turpentine operators, as has so often been the case, began when it made little

matter whether their operations were carried on economically or not. They have continued in certain ways partly because they were the old ways and also largely because the efforts to change their methods have been based mainly on chemical analyses in the office and on the general conception of what might be possible, instead of on actual experimentation in the field. Now, the Bureau of Forestry hopes, with the coöperation of the operators themselves (which, I am very glad to say, has already been secured on a large scale), to assist them to use methods that will save that industry to the South.

The chemical uses of wood is another great field just opening out.

Then the need of forestry in the Philippines will occur to you, and there is work urgently needed in Porto Rico. But in the Philippines especially, with their 40,000,000 acres of forest, there is a field for foresters which will develop, as I think, one of the best systems and one of the most useful bits of forest work that we shall see for many a long day.

I received the other day a copy of a Houston (Texas) paper, containing an account of a banquet given to Mr. John H. Kirby, who has organized the Kirby Lumber Company and the Houston Oil Company. Together they control a million acres of longleaf pine timber in Texas. The Bureau of Forestry is to make a working plan for conservative forestry on all this land. This is one of the most important pieces of private work the Bureau of Forestry has before it. The people who were at the banquet listened to addresses from a number of prominent lumbermen, and especially from a number of the editors of lumber papers, and it was with the keenest delight that I read the uniformly favorable comments of the men who control the lumber press on Mr. Kirby's undertaking.

Interest in forestry is waking up all over the South. We have, in addition to this Texas work, 50,000 acres of Longleaf Pine to be taken up in South Carolina, 16,000 acres of hardwoods near Grandfather Mountain, in North Carolina; 62,000 acres of pine in Georgia, 60,000 acres in eastern Tennessee, and a

good deal of land, in addition, in the Appalachian range. It is fair to say that the southern end of the country, which for a long time was slow in taking up this new movement, has now waked up.

In the Northeast there is the work in Maine, likely to lead to the adoption of forest methods on a large scale not only by the Great Northern Paper Company, but by many other similar organizations; the work in New York State, with which you are familiar, and much more.

There is also before us, and that is the most important work the Bureau has, the preparation of forest working plans for the national forest reserves.

In forest investigation the field is so large that it is difficult to talk about it briefly. We know so little of our forests, we have actual statistics of so few of the commercial trees, that it is practically possible to do an almost unlimited amount of work, if you have the men, in any particular section of the country. We hope to continue studies of important hardwoods in the Smoky Mountains on the Cumberland Plateau, of second-growth hardwoods in New England, Balsam in Maine, Western Yellow Pine in Arizona, and Sugar Pine in California and Oregon. Some of this work is already under way. Especially we are going to study, and have already begun to some extent, the second-growth question in the East, and particularly in New England. The whole question of second growth needs to be investigated and put on a practical business-like basis. We know something now about certain kinds of second growth—about the time it takes to grow a second crop, and so on—but I do not think enough attention has been given to it hitherto.

Nor do I think enough attention has been given to small holdings. The Bureau has often been forced into the consideration of large holdings by their very extent. Now we want to do more work for the individual farmer, which, of course, means the preparation of working plans for a few and the wide publication of the results.

The Hickories, Oaks, Ashes, Elms, Chestnuts, Beeches, and Sweet Gum require attention, mainly in the South;

so do forest distribution in Nebraska, Colorado, and Montana; forest fires in a number of different places; the whole grazing question, especially in the West; the study of forest products in coöperation with the Bureau of Chemistry—work which is just beginning and of which I expect most important results, particularly for the Philippines; and the immensely important work with the railroads.

Finally, I want to speak about the work in tree-planting. I have become intensely interested in that side of the Bureau's activity during the last year, and I am looking forward to results of very great importance from the study that has been made this summer of the possibilities of unoccupied lands in Nebraska. My feeling is that very great stretches of the arid middle West are capable of producing trees and sustaining a tree growth after the first restorative step has been taken by man. As you all know, artificial plantations a little farther east have constantly assumed the characters of natural forest, have reproduced themselves on the ground, have made a forest floor, brought a forest fauna and flora together, and have begun to spread. That means that these forests are perfectly capable of sustaining themselves indefinitely after they have once been

started. I want to see that sort of thing tested on a large scale still farther west. I believe there are immense tracts there which are capable of producing under forest immensely more than they can in any other way, and I believe our results in that direction are going to be exceedingly useful. The tree-planting work, not only there, but in connection with the railroads, too, is, I think, going to demand more and more attention. The field in that direction is largely unexplored as yet, and the work must go ahead.

This is an exceedingly hasty and imperfect glance at the field, but it is enough to give us all a realizing sense of a vast opportunity and an enormous task. A few years ago, when the fight for the forest reserves was on, it often seemed as if we were going to lose not only the reserves we had, but any opportunity to make new ones. Now the outlook is as attractive as it was gloomy then. The lesson of the vast and varied field seems to me to be that we must all work together as a unit, whatever our particular affiliations may chance to be.

All of us who are occupied in forest work must understand that the progress of forestry is the common aim, and not the prosperity of any particular organization, and that I think we do.

THE BOUNDARY LINE BETWEEN THE DESERT AND THE FOREST.

BY S. J. HOLSINGER,

General Land Office.

POSSIBLY there is no portion of the United States where the necessity for forest preservation is more keenly felt than in Arizona. I know of no section of the country, except it may be southern California, where it is of such vital importance. There has been an almost unanimous demand by the citizens for the preservation of their forests, and about 5,000,000 acres in this territory have been set aside by the President's orders for forest reserves.

Private ownership of the forested lands of the territory has very much complicated matters, but the people realize all the more the necessity for the speedy application and enforcement of practical forest regulations, as opposed to wasteful methods of lumbering and the outright vandalism heretofore practiced.

It is gratifying to know that the forest reserves are already bearing fruit. Necessarily their organization and en-

forcement have met with many obstacles. It is passing through a crucial period, but we have such confidence in the energy, ability, and zeal of those who have the guardianship of the public forests that we can reasonably anticipate the establishing of one of the most perfect and successful forest systems of the world.

During the past twenty years the farmers in the fertile valleys of Arizona have been absorbed in the herculean task of constructing systems of irrigation. Not until recently have they

first invaded by the white man the forests were open, devoid of undergrowth, and consisted in the main of matured trees, with practically no forest cover. Instead of forest undergrowth, the ground was well set with perennial grasses and other herbage, which, being undisturbed, maintained what may be termed a normal condition, or such as existed when the country was first settled and such as is now so much to be desired. It was not an uncommon thing for the early settlers to cut native hay in the pine forests and fill large govern-



BOUNDARY LINE BETWEEN THE FOREST AND THE DESERT, SHOWING YOUNG GROWTH OF JUNIPER AND PIÑON, CAPITAN MOUNTAINS, NEW MEXICO.

paused in this work for a breathing spell, and, while relaxing muscle and brain, have inquired concerning material changes which have transpired on the great watersheds and the fountain-head of their water supply. They have been startled to learn that while, with a few exceptions, the rainfall throughout the territory has been normal, without exception the water supply has annually decreased.

Briefly, the history of the forests of Arizona, which my opportunities have enabled me to gather from many of the oldest reliable pioneers, is that when

ment contracts at the different military posts. As an instance, Fort Whipple, near what is now the Prescott forest reserve, may be mentioned. Where hundreds of tons of hay were cut under the actual spread of the forest trees during the sixties and seventies, there is not now enough grass on a thousand acres to keep in condition a family cow. Where were then running streams are now dry arroyos, and where were then living springs are now beds of silt and sand. However, there is some hope in the fact that where once the grass flourished there is now a vigorous young

forest, which promises full compensation under the protection of a forest reserve.

The remains of extensive ruins in almost every section of Arizona warrant the conclusion that a populous prehistoric people occupied the land during a period of many centuries.

The unwritten history of the Southwest is phenomenal. These prehistoric aborigines must have exerted a marked influence upon the vegetation of the country. Their fires, and those of the historic races, unquestionably account

as the forests of the Mogollon Mountains, extending through New Mexico and Arizona. This is due not entirely to the arid condition, as is popularly supposed, but to the continued occupancy of the country for centuries by prehistoric races, who merged into the Indian tribes occupying the country at the present time. All through Arizona the regrowth of pine forests dates somewhere during the past half century, and, with a few exceptions, nowhere antedates the early settlement of the country by our own race.



BORDER OF THE "BLACK FOREST." A CEDAR FORESTED AREA BETWEEN THE SAN FRANCISCO MOUNTAIN AND PRESCOTT FOREST RESERVES, ARIZONA.

for the open condition of the forests, to which reference has been made. The high pine forests were their hunting grounds, and the vast areas of foothills and plateaus, covered with oak and nut-bearing pines, their harvest fields. Here they lived in their summer homes, kindled their camp-fires, and harvested crops of acorns, nutritious nuts, and in many instances cultivated vegetables and cereals.

Possibly no forests on the Pacific coast show so small a percentage of regrowth and so slight a tendency to reproduction

From Puget Sound to the Gulf of California these strange people rambled at will, but their abiding place was on the border land between the forests proper and the "Staked Plains" in the southwest. The extensive ruins indicate that they inhabited the fringe, so to speak, of the forests which, like vanguards, were working their way down from the mountain tops into the desert plains. The most potent and powerful weapon in the hands of these aborigines was the firebrand. It was alike used to capture the deer, the elk, and the



BRUSH LANDS OF THE DESERT IN ARIZONA.

antelope, and also to rout or vanquish the enemy. It cleared their mountain trail and destroyed the cover in which their quarry took refuge.

In the North, nature was quick to heal the ravages of fire, and the damage to forest growth was reduced to the minimum. In the dry and more arid regions nature recuperated slowly, and the relentless flames left everywhere an indelible mark. In Chaco Cañon, where a deep arroyo or wash has cut to the depth of thirty feet through a sedimentary formation, distinct strata of earth, impregnated with charcoal, from fifteen to twenty feet from the surface, may be traced over an area of many thousands of acres. Elsewhere the alluvial and silt deposits and forest trees have recorded the unmistakable evidence of numerous and extensive forest fires which have occurred at intervals during many centuries.

How far the occupancy of the prehistoric and historic tribes has retarded the progress of foresting it is impossible to say, but it must have been no small factor. These areas—that is, those most frequented by the cliff, caveta, and pueblo builders—were then and are now of great importance, because in the region inhabited by them the battle be-

tween vegetation and the unfriendly elements was and is now fiercest. These areas form the boundary between the forest and the desert. Vegetation is here dwarfed, but struggling to enlarge its domain. Were it not for the long Indian occupancy and the ravages of fire incident to their habitancy, vast territories now barren desert wastes might be covered with a forest growth, at least such as is indigenous to arid regions. Irrigation would have reclaimed many hundreds of acres now hopelessly barren.

When the country was invaded and occupied by the white settler, though marked changes were inaugurated, the forest conditions were not improved. From a forest standpoint, a comparison drawn between the condition during Indian occupancy, with no domestic animals, and that with the civilized race, with its flocks and herds, would be decidedly to the credit of the former. Under the latter the destruction by fire was reduced; annual fires were replaced by accidental fires of less frequency, but more damaging. Wasteful methods of lumbering and the introduction of herds increased the sum total of forest devastation.

In Arizona you will find no young forests of any considerable extent antedating a period of forty years, and almost all of the regrowth has sprung up during the last quarter of a century. A single exception may be noted in the White Mountains, which have been occupied for a couple of centuries by the Apache Indians. These forests show, in certain localities, all classes of regrowth, and are in marked contrast to the mountain country occupied by the Navajo Indians in the northeastern portion of the territory. The Navajos have possessed sheep and goats and followed pastoral pursuits for over two centuries. The forests occupied by

them show practically no regrowth. The Apaches have followed the chase and war, and have entrained themselves with nothing but war ponies. The forests within their domain, where they have not seen fit to apply the torch in accord with their well-grounded superstition that forest fires cause rain, show a regrowth gradating into many past decades.

My experience forces me to the assertion that the diminution of the flow of springs and streams in Arizona is due more to the destruction of brush, grass, or herbage, than the destruction of forests proper. I would not be understood as opposing the pasturing of public lands as a principle, but as indiscriminately practiced under no restrictions, as at the present time. We must have our herds, but it cannot be denied that the free ranging of stock on the public domain is measurably responsible for the unfavorable conditions which we find on the watersheds today.

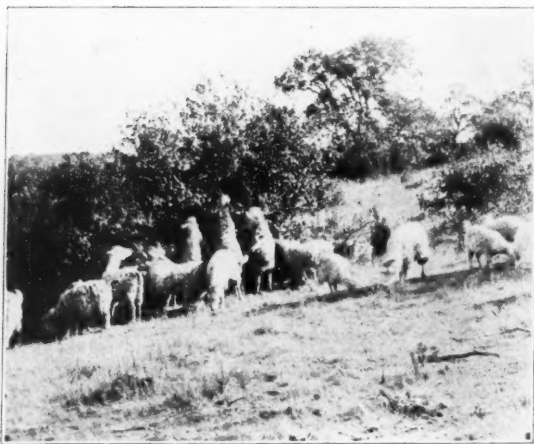
The country is not naturally well adapted for stock-ranging. The infrequency of springs and open water compels stock to travel long distances. They destroy much more forage traveling over it in search of water than they consume. So great, in fact, is the distance in many instances that cattle travel from ten to fifteen miles and horses from fifteen to twenty miles for water. It is not an uncommon thing to see both horses and cattle running at a pace of from eight to ten miles per hour over the desert plains in order to shorten the time between drinks. I do not know that this has been paralleled even by the proverbially thirsty governors of the Carolinas.

When a drouth occurs, there is presented a problem in arithmetical progression and in vegetation destruction, which is something like that which astounded us all in our early schoolboy days when we figured the compensation of the blacksmith who in shoeing a farmer's horse modestly started in with the compensation of one grain of corn for the first nail driven. The ratio at which destruction increases as water and feed become scarce is something wonderful, and only in late years is it

beginning to be understood by the western farmer. The plowing by their hoofs at such times pulverizes the ground, and the wind and rain disintegrate the soil, and much, and often all, of the vegetation dies. Near Winslow, Arizona, and other points there are hundreds of acres of once thoroughly sodded meadow land which the winds have swept clean of soil, only the sand-rock and an occasional hummock now remaining. This was made possible by overpasturing. Other localities are subject only to the wash of flood water.

Range stock of any kind in its journeying to and from watering places will seek the best grade and the least obstruction for its trail. These fall in the lowest lands of the valleys, plains, and plateaus. A path once broken is a channel for the next flood water, and in time where was once a trail there is a wash, only limited in depth by the bed rock. Before these level or rolling lands were broken there was a normal moisture line, which enabled vegetation to exist by remaining near the surface. When the wash occurs that moisture line is dropped in proportion to the depth of the wash, and thus increases the drainage of the soil. In many instances it drops beyond the reach of the grasses or other vegetation, and the land becomes barren.

On the open range the horse is the chief of all destroyers. He is the only herbivorous domestic animal having upper and lower teeth, and if necessity demands he will not only crop the blades, but the crown, and then possibly dig for the roots. There are instances where "bronchos" roaming the plains of Arizona have actually dug to a depth of six feet to obtain water. In their order I would name the horse, sheep, goat, and cow as despoilers of ranges. In the forest and forest covers the order is reversed, and you may see the goat, standing on his hind feet, his whiskers flowing in the breeze, while he, master of all he surveys, placidly dines off of the succulent shoots of any tree or shrub of which his fancy may approve. We have had no warning note, but the goat is coming, and, like the Chinaman, it will require legislation to banish him. Next to the goat, his near relative, the sheep,



ANGORA GOATS FEEDING UPON YOUNG TREES AND BRUSH.

is an able ally in forest destruction. Then may be named cattle and, last, horses. The horse is a very demure and well behaved animal in a forest, but every farmer knows what a few of these frolicsome animals will do in a meadow, and what they will do in a meadow they will do on the open range, and more, for here there is no restraint whatsoever. It is unfortunate that the ranges of Arizona are so thoroughly stocked with worthless horses.

The only thing which has in any marked degree withstood these destroying agents has been the plain, homely, despised brush, and this humble ally of the forest needs fostering and more adequate protection. It is on the brush-land areas, the boundary between forest and desert, that serious forest problems are being solved. Brush lands are the last barriers between the forest and the desert plains and the valleys. It is the brush which fastens the soil to the mountain side; it is the brush which defies the flood water in its search for a channel; it is the brush which turns the flood water out upon the surface and irrigates the mountain, hillside, and plain; it is the brush which transforms the rocky, barren cañon into a narrow valley, filled with soil and teeming with vegetation; it is the much-despised brush which successfully checks ero-

sion, fills cavities, forms natural storage basins, and establishes conditions favorable to artificial irrigation and water storage. The destruction of this forest growth referred to will undo all these wise provisions of nature.

I have witnessed the total destruction of ten or fifteen acres of rich, arable, bottom land in a single flood, due to the careless cutting of a growth of brush land or dwarf timber. An instance of this occurred on Granite Creek, Yavapai County, and Aravaipi Canyon, in Pinal County, last year. At the mouth

of a side branch of each of these cañons was a growth of scrubby timber which enlocked a great deposit of boulders and silt. These trees were cut for fuel, and, during a flood which followed, a wash opened at the denuded area and continued up the canyon through the small ranches until again checked by the growth of the timber above.

The forests in question usually consist of Mesquite, Cat-claw, Palo-verde, Tornillo, Ironwood, Chapparal, Manzanita, Walnut, Cherry, Sycamore, Ash, and a dozen species of Oak. Even the numerous species of *cacti* play an important part in the struggle against erosion. It usually grows on land unfit for cultivation. There is now a lively demand for the timbers named for domestic and steam purposes at the various mining camps.

At the present rate of consumption, coupled with incident fires and pasturing, it will not be long before serious damage will occur on these watersheds, unless some practical system of adequate protection of cutting and removing this fuel timber is adopted.

While this class of timber has received due recognition by scientific men, the average citizen has been slow to see its value. Schooled in the east and middle west to regard brush as a thing to be despised, subserving no economic pur-

pose, it is hard to remove this prejudice, and hence there has been practically no local demand for the reservation of such land. I am pleased, however, to state that the government has included some valuable brush land within the boundaries of the present forest reserves.

Recently a movement has been inaugurated by the Arizona Forest and Water Protective Association to attach large areas of this class of forested lands to the forest reserves. It is certainly a step in the right direction, and it is to be hoped that this organization will be able to mold sentiment and awaken the interest this subject deserves.

Observation must lead one to the conclusion that nature seldom, if ever, grew a tree where it was not needed. Especially is this true in the West. Even in the Middle States the farmer often wrecked his iron constitution in destroy-

ing the stumps of forest trees which would be worth today twenty times the value of his farm. The Arizona pioneer should at least think twice before applying the ax, and more than that proverbial period of reflection before applying the torch to the brush lands or giving them over to the now popular Angora goat.

That the majestic forest trees, the pride and glory of our mountains, may unfold their buds and wave defiance to storm and drouth, the shrubbery and lesser forest about their base must be preserved. As the flower of Napoleon's great army was always surrounded by a picked and tried skirmish line, so must our forests be guarded by a tenacious and vigorous forest cover, which will stay erosion, conserve moisture, and so establish conditions favorable to natural and artificial irrigation.



VIEW TAKEN IN A GLADE IN THE CAPITAN MOUNTAINS, NEW MEXICO, TEN MINUTES AFTER A SUMMER SHOWER, SHOWING THE WATER BREAKING THE SOD ON A CATTLE TRAIL, MAKING THE FIRST WASH OR CUT IN THE VALLEY.

TWENTIETH ANNUAL MEETING OF THE AMERICAN FORESTRY ASSOCIATION.

I. Minutes of the Meeting and Resolutions.

THE American Forestry Association held its twentieth annual meeting in the ball-room of the New Willard Hotel, at Washington, D. C., December 11, 1901.

The President of the Association, Hon. James Wilson, Secretary of Agriculture, was in the chair during part of the opening session, and the First Vice-President, Dr. B. E. Fernow, conducted the remainder of this session. The attendance was large, and the business transacted included the election of officers, the report of the Board of Directors, and the Treasurer's report. A pleasant innovation was the formal luncheon given by the resident members to the visiting members, at which about sixty persons, including a number of ladies, were present.

MORNING SESSION.

The morning session was called to order at 10.30 a. m. by President Wilson, who made a short address, in which he called attention to the great strides forestry has made during the year.

Mr. Gifford Pinchot then read the report of the Board of Directors (see page 29), which was approved and accepted.

While the reading was in progress, Secretary Wilson called Dr. Fernow to the chair.

The chair announced the following committees: Committee on Resolutions, Hon. E. A. Bowers, Dr. B. E. Fernow, Prof. Henry S. Graves, Mr. F. V. Coville; Committee on Nominations, Col. William Fox, Mr. George P. Whittlesey, Mr. Otto J. J. Luebker; Auditing Committee, Mr. E. C. Barnard, Mr. George B. Sudworth.

The report of the Treasurer was then read and accepted. (See page 34.)

The chair then called on some of the visiting members for a few remarks,

responses being made by Dr. C. A. Schenck, Director of the Biltmore Forest School, and Mr. Elihu Stewart, Forest Inspector of Canada.

The morning session then adjourned to attend the luncheon given in the adjoining banquet-room to visiting members and to guests of honor. Secretary Wilson presided, and after the luncheon addresses were made by Prof. Henry S. Graves, Director of the Yale Forest School; Dr. B. E. Fernow, Director of the New York State College of Forestry, and Dr. W. J. McGee, Chief of the Bureau of Ethnology.

AFTERNOON SESSION.

At the conclusion of the lunch, the afternoon session was called to order by Dr. Fernow.

Mr. George B. Sudworth for the Auditing Committee, reported that the accounts of the Treasurer had been examined and found correct. Mr. Edward A. Bowers, for the Committee on Resolutions, submitted the following:

1. *Resolved*, That the Association renews its recommendation, urged at its last two annual meetings, that all branches of the Federal Government now in charge of any work relating to the public timber lands and the forest administration of the United States be united in and under the Bureau of Forestry, Department of Agriculture.

2. *Resolved*, That we express our commendation of the important step taken by the State of California toward the establishment of a Redwood forest park by the purchase of the Big Basin, Santa Cruz Mountains, and we urge the extension of the state's interest in the permanent preservation of a representative area of these magnificent forests.

3. WHEREAS the States of North Carolina, South Carolina, Virginia, Alabama, Georgia, and Tennessee have shown their great interest in the establishment of a National Park in the

Southern Appalachian Mountains by proposing to remit from taxation and to cede to the Federal Government jurisdiction over such lands as may be purchased for this purpose; and

WHEREAS this Association has heretofore approved the efforts to create such a park,

Be it resolved, That we earnestly support the present movement in Congress to obtain an appropriation to purchase the lands necessary for the creation of the National Appalachian Park or Forest Reserve.

4. WHEREAS in the State of Nebraska there are public lands to the extent of about 10,000,000 acres, consisting of sand hills, which are more fit for tree growth than for other purposes; and

WHEREAS experiments by the Department of Agriculture, instituted in 1890, have proved the adaptation of this region for tree growth, especially of coniferous kinds; and

WHEREAS it appears that public sentiment and the officers of the state are in sympathy with the policy of devoting these lands to timber growth,

Be it resolved, That this Association favors the setting aside of a reservation of 500,000 acres, to be devoted to forest purposes in this area.

After a few verbal changes, the resolutions were adopted.

Mr. George P. Whittlesey submitted the report of the Nominating Committee, recommending the reelection of all the old officers, excepting some five or six changes in the list of vice-presidents.

On motion, the Secretary was instructed to cast the ballot for the nominees reported by the Nominating Committee; which being done, they were declared elected.

Mr. Elihu Stewart invited the Association to join in the meeting of the Canadian Forestry Association, on the second Thursday in March, 1902, at Ottawa.

The meeting then adjourned.

In the evening a large number of the members were very delightfully entertained by Mr. Pinchot at his home on Rhode Island avenue.

II. Report of the Board of Directors.

A Notable Year of Forestry.

The past year has been the most notable one in the history of forestry in this country. A remarkable increase of interest in the subject is shown by the people, and, as President Roosevelt says in his first message, "public opinion throughout the United States has moved steadily toward a just appreciation of the value of our forests."

The year has witnessed great activity in local, state, and federal circles. State legislatures have passed laws to encourage forest preservation, several have created Departments of Forestry, new state forest associations have been organized, and old organizations continue active.

A mere recital of the important events during the past two months will show the present strong tendency of forestry. Two months ago a prominent lumber company asked the assistance of the Bureau of Forestry in the handling of a million acres of timber land. This act meets the approval of lumber interests on all sides. The Secretary of the Interior recommends that the administration of the forest reserves be transferred to the Department of Agriculture, in order that they may be under the direction of trained foresters. The President makes the same recommendation in his message to Congress, and insists that "the preservation of our forests is an imperative business necessity;" and, further, that "the forest and water problems are perhaps the most vital of the internal questions of the United States."

Another striking incident is the bringing together by a great railroad company of more than two hundred of its leading officials to hear lectures on forestry. Finally a bill is introduced in Congress which would appropriate \$10,000,000 for the purchase of 4,000,000 acres of forest lands to establish a forest reserve in the Southern Appalachian Mountains. The people have come to realize that forestry is economically sound, and that one of the imperative duties of the nation is, in the language

of the President, to "perpetuate the forests by use."

The Forest Reserves. During the year two new forest reserves were declared by President McKinley—the Wichita Reserve of 57,120 acres in Oklahoma, on July 4, and the Payson Reserve of 86,400 acres in Utah, August 8. There was also an addition of 142,080 acres to the Cascade Reserve in Oregon.

An interesting matter in connection with the administration of the reserves is the recent action of the Secretary of the Interior in reorganizing the Division of Forestry of that Department. Under the new arrangement this division will be under the direction of a trained forester, and much-needed reforms in the handling of public timber lands may be looked for.

That the administration of all the forest work of the government forest reserves should be united under the control of the Department of Agriculture is everywhere understood, and the recommendation of the Secretary of the Interior in his latest report that this transfer be made ought to do much to bring it about. President Roosevelt in his message directs the attention of Congress to this matter also, and it is hoped that this much-needed change may be made at an early day. Secretary Hitchcock sums up the situation correctly when he says that "the presence of properly trained foresters in the Department of Agriculture makes the ultimate transfer of the administration of the forest reserves to that department essential to the best interests both of the reserves and the people who use them."

More than ever do the people of the West realize the wisdom of the policy of establishing forest reserves, and the great need of a careful administration of the timber and water resources of that section.

Bureau of Forestry. On the 1st of July the Division of Forestry of the United States Department of Agriculture was advanced to the grade of a bureau. This was provided for by the last session of Con-

gress, which appropriated for the expenses of the Bureau of Forestry during its first year \$185,440. This action shows how rapidly the forest work of the government has expanded of late, and also how well it has commended itself to Congress.

The change from a division to a bureau and the larger appropriation made possible both an improved office organization and more expanded field-work.

Action by States. The Pennsylvania legislature passed an act in

February raising the Division of Forestry of the State's Agricultural Department to the position of a Department of Forestry. The department consists of a Commissioner of Forestry and four others, who constitute the State Forest Reservation Commission, which is empowered to buy lands for the State Forest Preserve and have control of the same.

During the year a number of additions were made to the state forest preserves by purchase, and they now contain about 400,000 acres. At its coming session the legislature will be asked to establish a State Forest School.

Forest improvement and extension is being taken up in a practical manner by the State of Connecticut. The legislature at its last session passed an act authorizing the appointment of a state forester by the Board of Control of the Connecticut Agricultural Experiment Station. This act, also entitled the "Act concerning the reformation of barren lands," provides for the purchase of lands suitable for the growth of oak, pine, or chestnut timber, such land to be used as a state park. The annual appropriation for this purpose is small, but the move is one that will greatly increase interest in the forest conditions of the state.

In Indiana a State Board of Forestry was created by an act of the legislature last spring, while in Michigan at the last session of the legislature a tract of 100,000 acres was set apart for the use of the State Forest Commission.

The campaign to preserve the Redwood forests of the Big Basin, in the Santa Cruz Mountains of California,

has met with success. The legislature of that state in March appropriated \$260,000 for their purchase. By this act the State of California not only did a great service to the cause of forestry in the United States, but also gave its citizens a superb park.

The Minnesota legislature at its session last spring enacted a law that sets aside as a part of the state forest reserves all lands unfit for agricultural purposes that reverted to the state through delinquent taxes prior to 1891.

Meetings of the Year.

The summer meeting of the American Forestry Association was held at Denver, Colorado, August 27-29, in affiliation with the American Association for the Advancement of Science. The meeting was a distinctively western one, and was well attended. Interesting papers were read on a variety of topics, the questions of fires, grazing, relations of forests to water supply, and the forest reserves receiving especial attention. The papers read at Denver have been appearing in the *FORESTER*. The newspapers of Denver devoted much space to the meeting, and accounts of the various sessions were sent out to the papers over the country. The *Baltimore American*, in referring to the Denver meeting, had the following to say of the Association: "It is doing a good work, and a work which sooner or later must be undertaken by the entire people." The *Providence (R. I.) Telegram* recently said, editorially: "The American Forestry Association has done and is doing an incalculable amount of good."

New Forest Associations.

The list of national and state forest associations was augmented by three new organizations during the year. At Connersville, Indiana, in June, the International Society of Arboriculture was organized with over three hundred members, representing thirty states and several foreign countries.

The Tennessee Forest Association began its career at Sewanee, Tennessee, early in August, and the first annual meeting of the organization was held in Nashville in November. Much interest

in forestry throughout the state has been aroused through the efforts of this association, and there is significance in the fact that among the most enthusiastic members of the organization are a number of the leading lumbermen of the state.

The Society for the Protection of New Hampshire Forests was organized early in the year, and much work has already been done by its members. During the past summer a series of lectures on forestry, under the auspices of the society, were given at various towns in the state. The society now intends to follow up its preliminary work by engaging a trained forester, who will deliver lectures throughout the state and also be at the service of farmers and lumbermen, to give them advice in the handling of their timber land, free of charge.

It is interesting to note in this connection that there are now twenty-two national and state forest associations in the United States.

The Forester. During the past year 40,200 copies of the *FORESTER* were printed. Of this number 26,000 went to our members, subscribers, and exchanges, while about 14,000 sample copies were sent out, along with invitations to join the Association, to selected lists of names. In January Mr. H. M. Suter was appointed business manager, and on April 15th Mr. Henry James, 2d, under whose control the magazine had been for a year and under whose direction it was greatly improved, resigned. Mr. Suter was then selected to fill the vacancy. During the year just ended the advertising receipts of the *FORESTER* were doubled.

At a meeting of the Board of Directors held on October 8th the feasibility of enlarging and improving the *FORESTER* was discussed. It was felt that both the Association and the cause of forestry needed a better magazine. The proposition was then made that negotiations be entered into having in view the union of publication of the *FORESTER* with the journal known as *National Irrigation*, since both publications were devoted to the propagation of ideas related to the

conservation and use of forests and waters. Upon motion, it was voted that it was the sense of the Board of Directors that it would be desirable to combine the interests of the American Forestry Association and of the National Irrigation Association, as far as the official organ of each is concerned. Since the objects of the two organizations are in many instances identical, it is believed that one publication, covering the whole field, can be prepared at less relative cost and upon a higher standard than that reached by the independent publications.

Therefore, beginning with the January number, the name of the incorporated magazine will be **FORESTRY AND IRRIGATION**. The new magazine will continue to be the official organ of the American Forestry Association, and will be sent to the members upon the same terms as the **FORESTER** in the past. The new magazine will also be the official organ of the National Irrigation Association, though the identities of the two organizations remain separate, as in the past. Under the new arrangement, the decided increase in circulation will permit of much better arrangements for publication, and the result will be that the members of the Association will get a much better publication at the same price as heretofore.

This consolidation is a tangible evidence of the earnest and loyal support given to the forest movement by the friends of irrigation, and to the irrigation movement by the friends of forestry. The most cordial coöperation exists and will continue, for there are no two bodies of public-spirited citizens more closely cordially united than these.

Growth of the Association. During the year just completed 589 new members have been received into the Association. During the same time there were dropped from the rolls 123 members, and there were 71 resignations and 16 deaths. The active membership now stands at 1,849 members. Of the new members secured, sixteen (16) are life members, four (4) sustaining members, and five hundred and sixty-nine (569) annual members.

There has been a steady increase in membership from the States of Massachusetts, New York, Pennsylvania, and the District of Columbia. There has also been a substantial increase in Connecticut, Illinois, Colorado, California, and Canada.

Appalachian Forest Reserve. The movement, begun in 1899, to establish a forest reserve in the southern Appalachian mountains has received considerable impetus during the year. In January, Secretary Wilson's report regarding the preliminary investigation was sent to Congress by President McKinley, who recommended its favorable consideration. A bill appropriating \$5,000,000 for the establishment of the reserve was then introduced in Congress, but, owing to the shortness of the session and the great amount of important business to be transacted, it did not reach final consideration. Meantime the legislatures of Virginia, North Carolina, South Carolina, Tennessee, Alabama, and Georgia passed bills ceding to the National Government authority to acquire title to lands within their boundaries for forest-reserve purposes, with exemption from taxes. At the present session of Congress the same bill has been introduced in the House and Senate, but with double the appropriation in the House.

The plan for establishing a forest reserve in the southern Appalachians has been received everywhere with approval. As Secretary Wilson says in his annual report, "The creation of the proposed reserve is urgent, in order to protect the headwaters of the important streams, to maintain an already greatly impaired supply of timber, and to provide a national recreation ground which, with the exception of the Adirondacks, will be readily accessible to a larger number of people than any other forest region in the United States."

The Forest Schools. The rapid increase of interest in forestry throughout the country is nowhere more noticeable than in educational circles, and a most gratifying increase in

attendance is reported from the forest schools.

At the New York State College of Forestry there are now enrolled thirty-eight students, an increase of one hundred per cent over the attendance of last year. The Yale Forest School has thirty-one students, and at the Biltmore Forest School the new year has opened with eleven matriculates.

There is a growing tendency on the part of colleges and universities of the country to add courses in forestry to their curricula. Already forty-seven institutions of learning offer instruction in forestry, and it is worthy of notice that in several cases high schools are following the lead of the universities.

Nebraska.

During the past summer agents from the Bureau of Forestry studied the forest conditions of Nebraska, completing their investigations in October. The investigations covered principally the Platte River and its tributaries, the Pine Ridge district, and the Sand Hill region. In all, over forty counties were traversed.

As a result of this investigation, so thoroughly has the Bureau of Forestry become convinced of the practicability of foresting the Sand Hills that it is aiding the efforts to secure the setting aside of one or more tree-planting reserves in that region.

In any event this investigation will be of great value in determining future plans in regard to improving the forest conditions of the plains region.

In the South.

In no part of the country is wider interest shown in conservative forest management by private owners than in the Southern States. Up to date the amount of private lands in the South for which advice in handling has been asked of the Bureau is 1,534,000 acres, and a very large part of the work which will be done by the Bureau for private owners in the immediate future, will be in that section.

Progress in Tree Planting.

The past year has been notable both for interest and achievement in tree planting. Never before, not even dur-

ing the time of wholesale timber-claim planting, were so many trees planted in a single year. Reports of extensive work in this line from Florida, New England, the Middle Atlantic states, the Lake states, the Pacific coast, as well as from all the prairie states of the interior, have been received.

In the West a decided impetus has been given to tree planting by the fact that forest plantations have already proven profitable as financial ventures. On the other hand, in the East tree planting is found to be a valuable way of reclaiming waste lands and for protecting water supplies.

More than one hundred planting plans have been made for applicants by the Bureau of Forestry within the year.

Forestry in the Philippines.

Friends of forestry must view with satisfaction the thorough preparations that are being made to establish an effective forest service in the Philippine Islands. The work done during the first fiscal year by the Forestry Bureau, at Manila, is most encouraging. The announcement by its director that the working force will be increased and a definite forest policy inaugurated throughout the archipelago at the earliest possible day, makes the outlook for forestry in the Philippines most promising.

With practically all the forest lands in the islands under the management of the bureau, judging from results already accomplished, the exploitation of timber promises to be one of the most interesting economic problems in the Philippines.

A number of trained foresters recently secured in this country for the Philippine service have sailed for Manila to enter upon their duties. The Bureau of Forestry of the United States Department of Agriculture has been made an agent for the Forestry Bureau at Manila in securing men for the service there.

Obituary.

It is with great regret we report the death of Dr. Charles Mohr, one of the founders of this Association, who passed away on July 17.

Dr. Mohr was one of the pioneer advocates of conservative forest management

in the United States. In this movement he became one of the charter members who organized the American Forestry Congress in 1882, from which grew the present American Forestry Association. Dr. Mohr was elected Vice-President of the American Forestry Association in 1890 for the State of Alabama, and served in this capacity until 1900, when he moved to North Carolina.

Capt. Judson Newell Cross, President of the Minnesota State Forestry Board and Vice-President of the American Forestry Association for that State, died at Minneapolis August 31. Captain Cross was for years a strong advocate of the conservative treatment of the forests of this country, and was instrumental in having several state forest laws enacted.

III. Treasurer's Report.

The Treasurer submitted the following report for the year ending November 30, 1901:

Otto J. J. Luebker, Treasurer, in account with the American Forestry Association.

DR.		CR.	
To balance, December 1, 1900	\$637.81	By purchase of two Minn. & St. L. 4 per cent. bonds (French leg- acy).....	\$1,982.50
Dues.....	3,093.25	Salaries of editors.....	904.11
Life memberships.....	1,700.00	Salary of Treasurer.....	120.00
Sustaining memberships	100.00	Clerks for FORESTER.....	516.00
Donations.....	23.00	Clerk hire for Assistant Secretary and Treasurer.....	533.25
Sale of proceedings.....	11.75	Printing of FORESTER *.....	1,769.20
Subscription and sale of FOR- ESTER	223.75	Printing for Treasurer.....	38.00
Advertising	297.49	Printing for Secretary.....	87.00
Interest on bonds.....	180.00	Printing for FORESTER (miscel- laneous).....	33.35
Interest on deposits.....	28.28	Postage, Assistant Secretary.....	417.34
Legacy of J. D. W. French	2,000.00	Postage, Treasurer	78.58
		Illustrations, FORESTER.....	233.33
		Furniture	88.50
		Office stationery.....	52.05
		Sundries, Assistant Secretary....	82.06
		Sundries, Treasurer.....	136.27
		Typewriting machine and repairs.	108.00
		Traveling expenses, Assistant Sec- retary.....	256.00
		Binding.....	14.95
		Interest on \$1,000 loan.....	45.56
		Printing of membership list (1,650 copies).....	92.00
		Expenses of Denver meeting....	246.70
		Drayage.....	1.75
		Hall rent for annual meeting, 1900.....	3.00
		Made good a bad check.....	2.00
		Check book, revenue stamps.....	1.00
		Refunds of overpayments.....	5.00
			<hr/>
		Balance.....	\$7,847.50
			447.83
			<hr/>
	\$8,295.33		\$8,295.33

* This includes October and November of the fiscal year 1899-1900, but does not include November of present fiscal year.

Additional assets :

Two Chi. & East. Ill. bonds.....	\$2,305.00
Two Minn. & St. Louis bonds.....	1,982.50
Outstanding advertising.....	199.43
Outstanding dues (miscellaneous)...	50.00
Outstanding dues (1900 and 1901)...	598.00
<hr/>	
Total	\$5,134.93
A loan on one C. & E. Ill. bond....	1,000.00
<hr/>	
	\$4,134.93

Unpaid dues to the amount of \$648 are still outstanding, viz., for the years

previous to 1900, \$50; for 1900, \$184, and for 1901, \$414.

In accordance with the resolution passed at the last annual meeting, 123 names were dropped from the membership roll for non-payment of dues. The amount owed by the members so dropped was \$954.

Respectfully submitted.

OTTO J. J. LUEBKERT,
Treasurer.

TWO IRRIGATION PROJECTS.

I. The San Carlos Dam.

IN the recent annual report of the Secretary of the Interior he recommended the construction of three projects, the first of these being the San Carlos dam, on Gila River, in southern Arizona. The picture given here is a sketch of the proposed dam, showing the lake created and the flood water pouring out through the waste ways on each side.

This project is designed to regulate the flow of Gila River, storing the floods for the use of the agricultural Indians on the reservation below, and also to furnish water to at least 100,000 acres of government land in the valley between Florence and Casa Grande, a station on the Southern Pacific Railroad. The lands to be irrigated have been reserved from entry and settlement by the Secretary of the Interior.

The cost of the dam is estimated at a little over \$1,000,000. Measurements of the flow of the river at this point show that there is ample water to fill the reservoir, and that in addition to the needs of the Indians at least 100,000 acres can be irrigated. The reservoir site is on the Apache Indian Reservation, below Solomonville Valley. The ground to be flooded has little value, small patches being utilized by the Indians. These farms can be transferred to higher land along the reservoir, which will be wet in part by the receding waters of the lake and by ditches heading above the upper end of the reservoir.

Water for irrigation will be drawn out through the bottom of the dam, being controlled by gates located at the foot of the towers shown in the picture; a portion also can be taken out by a tunnel run through the solid rock of the abutments. By so doing a considerable part of the silt deposited in the reservoir will be drawn off, and the remainder, if it tends to accumulate, can be dredged or sluiced out by hydraulic processes, keeping the reservoir clean.

The water discharged back into the stream follows a narrow, rocky canyon for about forty miles. Measurements show that losses in this canyon from evaporation are compensated by the seepage received from side canyons. Passing beyond the Buttes, twelve miles above the town of Florence, the waters will be recovered in a canal located above all existing ditches, a sufficient amount being allowed to flow down to supply the needs of prior appropriators.

This large canal will be continued out on the south side of the river above existing works, a branch conducting water down to the Indian lands and another covering the public lands.

The legislation before Congress contemplates throwing open this land to homestead entry in small tracts, payment to be made to the government for the cost of storing the water, the annual installments being small. Title to the land will be given only after the proportional cost has been refunded by the settler.

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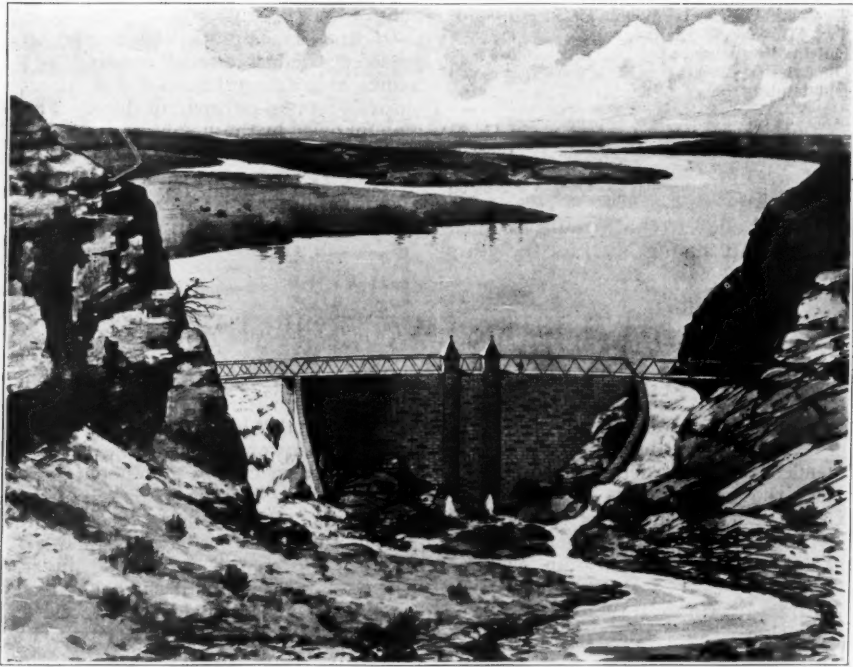
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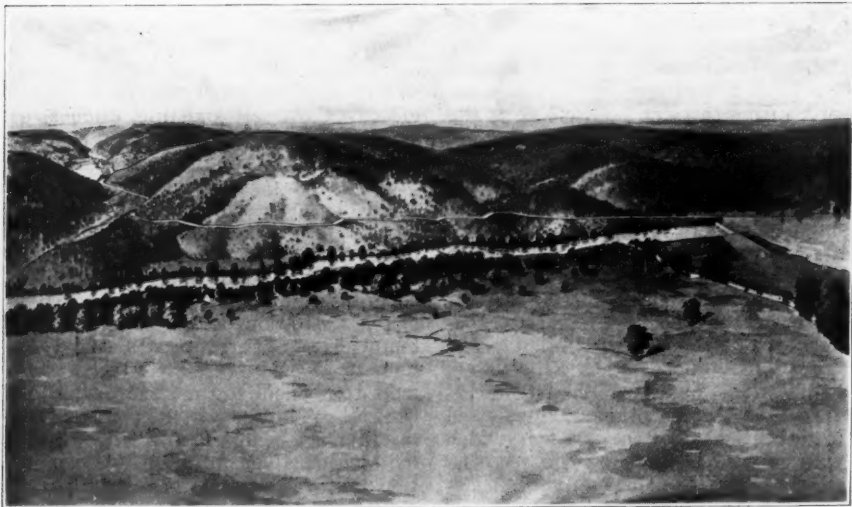
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PROPOSED SAN CARLOS RESERVOIR ON GILA RIVER, ARIZONA.



PROPOSED DAM AND CANAL, FROM ST. MARY LAKE, MONTANA.

II. The Saint Mary Diversion Canal.

Another reclamation project recommended by the Secretary of the Interior is that of the St. Mary Canal, taking water from the northern part of the Rocky Mountain region and conducting it across gravel ridges to the drainage flowing eastward. These gravel ridges force the water to flow north, and it is proposed to restore the ancient pre-glacial drainage by cutting across the interposing barriers.

On the extreme right of the picture is shown a dam holding back flood waters in St. Mary Lake. From this a canal leads along the side of the gravel-covered hills, and on the left passes through a gap occupied by a small lake, finally crossing the headwaters of Milk River.

It will be necessary to carry the water across the North Fork of Milk River to

the South Fork, into which it can be turned, or conducting it a few miles farther, allow it to flow into streams tributary to the Marias.

The water can either be allowed to flow in the natural drainage and be taken out by ditches at various points, or it can be kept in the canal and distributed to the great body of public land in northern Montana between the Milk and Missouri Rivers.

There are several alternative projects to be considered, but it has been estimated that for one of these the cost of taking out a canal to carry 1,200 cubic feet per second of the stored flood waters will be, in round numbers, \$1,000,000. This will bring the water to the head of Milk River or to vacant land in the vicinity. From here the distribution systems can be built by the settlers.

FOREST CONDITIONS OF THE HAWAIIAN ISLANDS.

BY W. R. CASTLE.

HAWAII is dissimilar from some tropical countries, in that it does not contain a solid mass of tropical vegetation extending from the mountain summits to the ocean. On the contrary, it needs forests, and there is presented here a noble opportunity for very fine work in this line.

In general, it may be said that the axis of Hawaii lies directly across the path of the prevailing winds and ocean currents. The mountain chains form the line of this axis, excepting on the islands of Hawaii and Maui, where the mountain system is represented by three huge mountain masses in the former, and two in the case of the latter island. We therefore find that the forests exist in lines coincident with the masses of vapor swept in by the winds; that is, as a rule, all of the northeast sides of all of the islands are covered with forests, and in some cases very densely. The forest growth has, in many cases, flowed over the tops of the mountains down to the southwest or leeward sides. In some instances a break in the mountain line

has occurred and the moisture passing through has resulted in a covering of forests along the lines of the valley or valleys, running toward the southwest. The southwest shores of nearly all of the islands are arid and barren, although the soil is extremely fertile. Wherever water has been brought to these slopes and plains the great fertility is shown in the production of abundant crops.

Some attempt has been made in past years to clothe a few barren hillsides of the country with forests. Many years ago the "algeroba" (a tree of the acacia family, probably bearing some resemblance to the mesquite tree of the southwestern United States) was introduced, and it has proven a very great advantage to this country, growing luxuriantly on the barren plains near the sea; making splendid firewood, shading the plains, producing a bean which is of great benefit and value to live stock, and enriching the ground by the very copious deposits of leaf mold. These trees have been placed upon the leeward sides of most of the islands and are doing well. Their growth



THIS VIEW SHOWS DENSITY OF FOREST GROWTH WHERE HEAVIEST RAINFALL OCCURS.



A PLANTED FOREST FIFTEEN YEARS OLD, HAWAIIAN ISLANDS.

is being fostered by inhabitants generally.

The slopes of the mountains were barren, and about fifteen years ago the Hawaiian Government undertook forest work, and very soon the hills back of Honolulu were clothed with a dense and luxuriant growth of eucalyptus of several varieties, the Australian wattle and other trees of that character. These trees have already exercised a noticeable influence in conserving rainfall and rendering the climate in the vicinity more agreeable.

The islands have a number of very fine cabinet woods, besides a few which are valuable for ship-building purposes, such as the making of knees, ox yokes and bows, and articles of that character; but it is a lamentable fact that with the introduction of many new plants, shrubs, and trees, insects have entered the country which are proving very destructive to much of the indigenous forest. We hope that one of the lines of work of the American Forestry Asso-

ciation, if a branch can be established in Honolulu, will be the devising of means to check the injury done by these pests.

Much of the virgin forest of the country has been destroyed in part by cattle and other foraging animals, as well as direct cutting away for agricultural purposes. The injurious effect of this upon the climate has already been so great as to vastly decrease the productive power of some of the localities. I, perhaps, in the absence of statistics, would not be justified in saying that the rainfall is materially less, but in places where in years gone by streams were running nearly the entire year, the water from the floods, poured down on the mountains, now rushes to the ocean in immense volumes, carrying off soil, plants, and in some instances houses. We believe that much of the injury which has been done is remediable, and think it within the province of a forest association to work on these lines.



VIEW OF HONOLULU, SHOWING BARE CONDITION OF THE MOUNTAIN SIDES.

PROGRESS IN TREE PLANTING.

BY WILLIAM L. HALL,

Bureau of Forestry.

THE past year has been notable for achievement and interest in tree-planting. Never before, even during the time of wholesale timber-claim planting, twenty years ago, were so many trees planted in a single year. Timber-claim planting was confined almost wholly to the Dakotas, Kansas, and Nebraska, whereas planting is now general. Reports of extensive work are in hand from Florida, New England, the Middle Atlantic states, the Lake states, and the Pacific coast, as well as from nearly all the prairie states of the interior.

WESTERN PLANTING.

Planting in the West has been almost entirely of a general nature. Trees have been needed on the prairies for shade, protection, beauty, and for their products, and trees have been planted for these purposes; sometimes for a single one, sometimes for all combined. They have been planted in areas of all sizes up to hundreds of acres.

There is yet great need of general planting on prairie farms. Many farms are entirely without windbreaks and shade, and many families are paying high prices for fuel that should be grown upon the farm. A forest plantation on a western farm is not a thing of comfort only, it is a matter of economy. It is in many cases the most useful and valuable portion of the farm. Education in the value of trees must be kept up until there will be no unprotected farms. Every effort must be put forward to attain this end. The present is a favorable time to encourage this kind of planting, because the prevalence of better financial conditions among western farmers has turned attention toward home improvement. Every article and bulletin filled with practical information and sent out now in readable form, is sure to do great good.

A distinct advance has been made in the kinds of trees planted. The rapid-growing softwoods have for several years been giving way to the slow-growing hardwoods. The change is almost complete. The Cottonwood and Silver Maple are no longer found in quantity in the western nurseries. They have been replaced by Ash, Elm, Locust, Walnut, and Cedar. As completing this change, we must hope for diversification of present offerings so as to include still other valuable species not now obtainable. It is next to impossible to obtain such trees as Red Elm and Hackberry in large quantities in the nurseries.

There is one point upon which great improvement is needed in western planting. Planters are too often well satisfied with indifferent results. They look with pride at their scattered, grass-bound trees, thinking them fully successful, when with different management they would be one hundred per cent better. Many an owner considers his cottonwood grove a successful plantation when the truth is it will be gone in a few years and the land again be prairie. Almost without exception among western planters, information is needed on methods of converting plantations of short-lived trees, such as Cottonwood and Silver Maple, into more permanent timber, such as Elm, Red Cedar, Walnut, and Oak. It is not generally understood that long-lived trees may be grown under protection of short-lived trees, to eventually take their places and form the permanent stand. Such information is slowly obtaining hold. Gradually both the cultural necessities and possibilities of planted timber are being learned.

One of the important facts recently learned is that forest plantations can be made profitable on a financial basis. The high price paid for fence posts in the West, and the general demand for

telegraph poles and railroad ties is making it possible to grow timber for these purposes with profits equal to those obtained from farm crops, even on the best agricultural land. Some of the timbers adapted for these purposes are easily handled and quickly grown in plantations. Planted timber of Hardy Catalpa, Osage Orange, Russian Mulberry, and Black Locust from fifteen to twenty years old, when cut and marketed as fence posts, returns an amount equal to a net annual gain of from five to fifteen dollars per acre from the time of planting. Some of these timbers a few years older would return a still higher rate if sold for telegraph poles and railroad ties.

Many such commercial plantations are being developed at the present time. The matter commends itself especially to the owners of large farms and ranches where thousands of posts are required annually to keep up fences. The railroads, too, are becoming greatly interested in this phase of tree planting. Some of the foremost roads are giving serious consideration to the question now, and are likely soon to begin extensive planting to provide for future supplies of timber.

EASTERN PLANTING.

Planting in the East has been largely accelerated in the last few years. A few isolated plantations were established years ago, such as that of David Landreth, in Virginia; Joshua Fay, in Massachusetts, and Gordon Woodbury, in New Hampshire, and have attracted general notice. There was also some planting for such practical purposes as that at Cape Cod, on sandy expanses near the seashore, to keep the soil from blowing. This planting represented



GROWTH OF PLANTED TREES IN THE ARKANSAS RIVER VALLEY.

only individual, or at best, local interest. There was until recently no general interest in the subject.

As indicating the change in public opinion, there are at the present time, besides almost numberless small plantations, many extensive operations in progress. In Pennsylvania Mr. N. T. Arnold, of Ridgway, is planting upon denuded mountain lands. Gen. Paul A. Oliver, of Oliver's Mills, has recently planted over 400 acres of cut-over land under the direction of a skilled forester privately employed. At Clinton, Mass., the Metropolitan Water and Sewerage Board is planting several hundred acres to protect the watershed forming the drainage area for its reservoirs. The Connecticut State Experiment Station is planting a tract on the sand plains of northern Connecticut to test the practicability of reclaiming such lands by forestation.

Eastern planting, besides for the direct object of producing timber, is being prosecuted for two purposes: First, to utilize otherwise valueless lands; second, for special purposes, such as the protection of water supplies, and in the improvement of game preserves.

Where, besides its commercial value, the forest will serve some special purpose, there is scarcely any room to question the practicability of planting on unforested lands. The question of

along the beach in Currituck County, N. C. Within the last few years the drifting sand has become a menace to the extensive improvements of the club and threatens to envelop them completely if not checked. To prevent such a disaster the club is compelled to resort to extensive forest planting.

In the past there has been no general application of economical methods in eastern planting. Both methods and cost have been marked by great varia-



SCOTCH AND WHITE PINE PLANTED ON STEEP HILLSIDE NEAR RIDGWAY, PENNSYLVANIA. THE YOUNG TREES, WHICH HAVE BEEN PLANTED BUT ONE YEAR, ARE TO BE SEEN AMONG THE STUMPS.

keeping pure and regular the water supply of cities is of first importance from the standpoint of health and economy, and very often this can be done by keeping the drainage area from which the reservoirs are supplied well wooded. As far as planting is necessary for this purpose it is highly practicable. Planting is also essential to protect and improve private parks and game preserves. A good example of this is the work proposed by the Currituck Shooting Club on their grounds

tion. The difficulty has been intensified by the absence of nurseries handling forest stock in wholesale quantities. It has been difficult to obtain such trees as the White Pine, except in sizes of from two to three feet and at prices of from \$25 to \$100 per thousand. Consequently plantations established from nursery-purchased stock have been burdened by so great initial expense that profitable return is impossible. Economical methods have been limited to growing the trees from seed or trans-

planting them from neighboring woodlands.

The question of economical methods of planting is all-important. On its solution depends the practicability of general forest planting. It is scarcely possible that forest planting can prove profitable at a planting cost of \$25 or \$30 per acre, but there is a probability of profit with an initial cost of \$5 to \$8 per acre. It is entirely possible to plant at the latter rates and purchase nursery-grown trees. The only way it can be approximated, even on large areas, is by the planter growing

his own trees, and this will be the method generally followed where extensive planting is to be done.

With few exceptions, the large plantations now being established both in the East and in the West are under the immediate direction of the Bureau of Forestry, which, after a study of individual locations, has prepared plans for establishing the plantations and will continue to coöperate with the owners in their management. The assistance of the Bureau has been extended to all applicants, regardless of the size of the plantation.

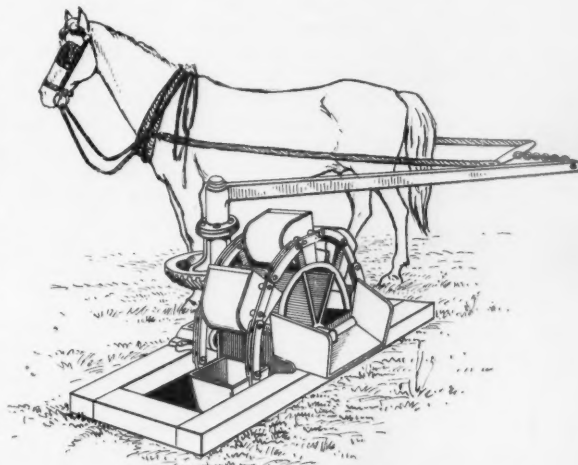
PUMPING WATER.*

THE greater portion of water used in irrigation is diverted by gravity from flowing streams. While this is true as regards bulk of the water, yet as regards value it may be said that some of the most important sources of supply are utilized through pumping. In ancient times, especially in Egypt and India, where labor had little value and the conditions for diverting water by gravity were not favorable, pumping by hand or by animal power was largely in vogue.

In modern times the devices for hand pumping have been improved upon, although some of them are still utilized in crude form by pioneers in the arid region; but with ordinary farm wells irrigation is impracticable, other than the watering of a few trees or plats of vegetables; but the beginnings of irrigation on many a farm in the sub-humid region may be traced to success-

ful experiments with water raised in this laborious manner.

The next step above human labor in pumping water has frequently been the



PUMPING WATER BY HORSE-POWER.

utilization of horse-power. The accompanying figure shows a simple device by which a horse walking in a circle causes a series of buckets to be lifted from the well, drawing up water sufficient for

* It is our intention to publish a series of articles on pumping, giving illustrations of the various kinds of engines, pumps, and windmills employed in different parts of the country, both East and West.—EDITOR.

several acres. The possibility of irrigation in this way is limited largely by the depth to the water in the well and the number of animals available.

The next step is the use of the ordinary threshing engine, replacing the horse and driving a pump as shown in the accompanying sketch. Tracts of considerable size have been watered in this way, and the value of the crops greatly increased. For example, onions, which would have been almost worthless, owing to a drouth, have as the result of water properly applied sold at \$150 per acre, and celery at \$200 per acre, repaying in a season the whole outlay for well, pump, and engine. Special forms of pumps driven by steam, gasoline, and other forms of engine have been devised suited to the needs of the irrigator.

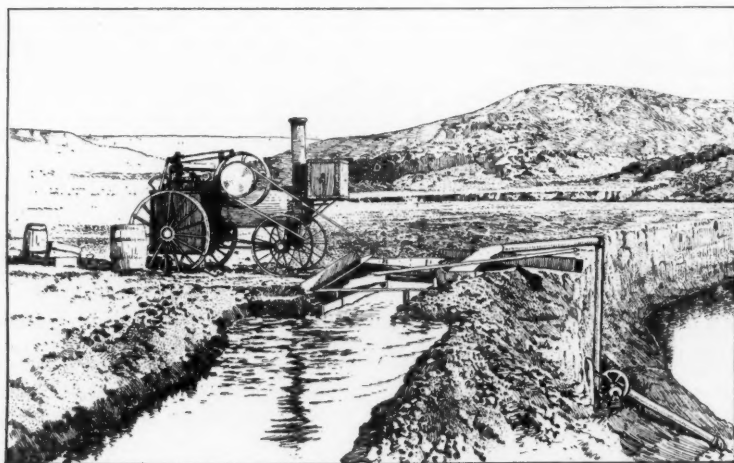
The most important source of power for pumping is the wind. On the broad valleys and plains of the arid regions the wind movement is almost continuous for days and weeks, carrying away the dry leaves, even at times sweeping up the loose soil. In many localities there are at depths of 20 or 50 feet or more beneath the surface, pervious beds of sand or gravel filled with waters by the infiltration of rainfall or by percolation from stream channels.

It is a comparatively simple and in-

expensive operation to sink a well into this water and erect a windmill, attaching this to a suitable pump. The machinery once provided is operated day and night by the ever-present wind, bringing to the surface a small, but continuous supply of water. This small stream, if turned out on the soil, would flow a short distance, then disappear into the thirsty ground, so that irrigation directly from a windmill is usually impracticable.

To overcome this difficulty, it has been found necessary to provide small storage reservoirs or tanks built of earth, wood, or iron to hold the water until it has accumulated to a volume sufficient to permit of a stream of considerable size being taken out for irrigation. Such a stream flowing rapidly over the surface will penetrate to a distance and cover an area which would seem impossible with the small flow delivered by the pump.

The windmills employed in irrigation are of all kinds, from the highest type of the machinist's art down to the crude home-made devices. These latter are not to be despised, as many of them are highly effective, and at least they have enabled settlers to procure a small amount of water and to obtain a foothold upon the soil, by which ultimately they may be able to obtain funds to procure better implements.



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INCORPORATED JANUARY, 1897.

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